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Thumberger

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[54] APPARATUS FOR MANUFACTURING ROTOGRAVURE PRINTING ROLL

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[52] **U.S. Cl.** **355/85**

[51] **Int. Cl.** **G03b 27/22**

[58] **Field of Search** 355/85

[56] **References Cited**

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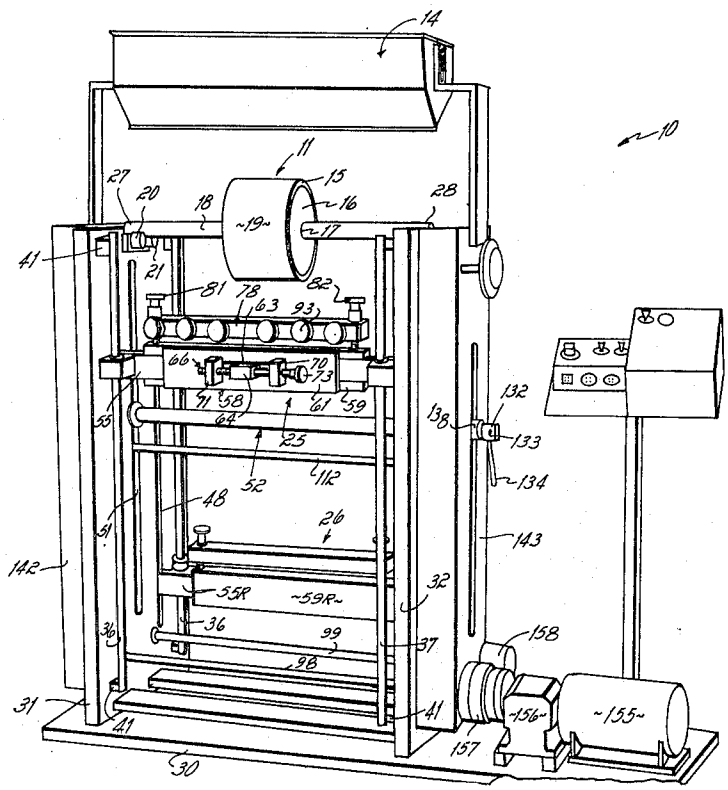
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[57] **ABSTRACT**

A method and apparatus for generating an etched printing pattern upon a copper jacketed rotogravure roll. The roll is coated with a light sensitive acid resist coating and a photographic positive film is draped over the roll. Rotation of the roll is effected during exposure of the roll to light by pulling one end of the tensioned film away from the roll while lifting the other end toward the roll. The tension of the film is adjusted so that the length of the film images exactly corresponds to the circumference of the roll. The apparatus accomplishes this tension adjustment and roll rotation by controlled movement of the film.

18 Claims, 4 Drawing Figures



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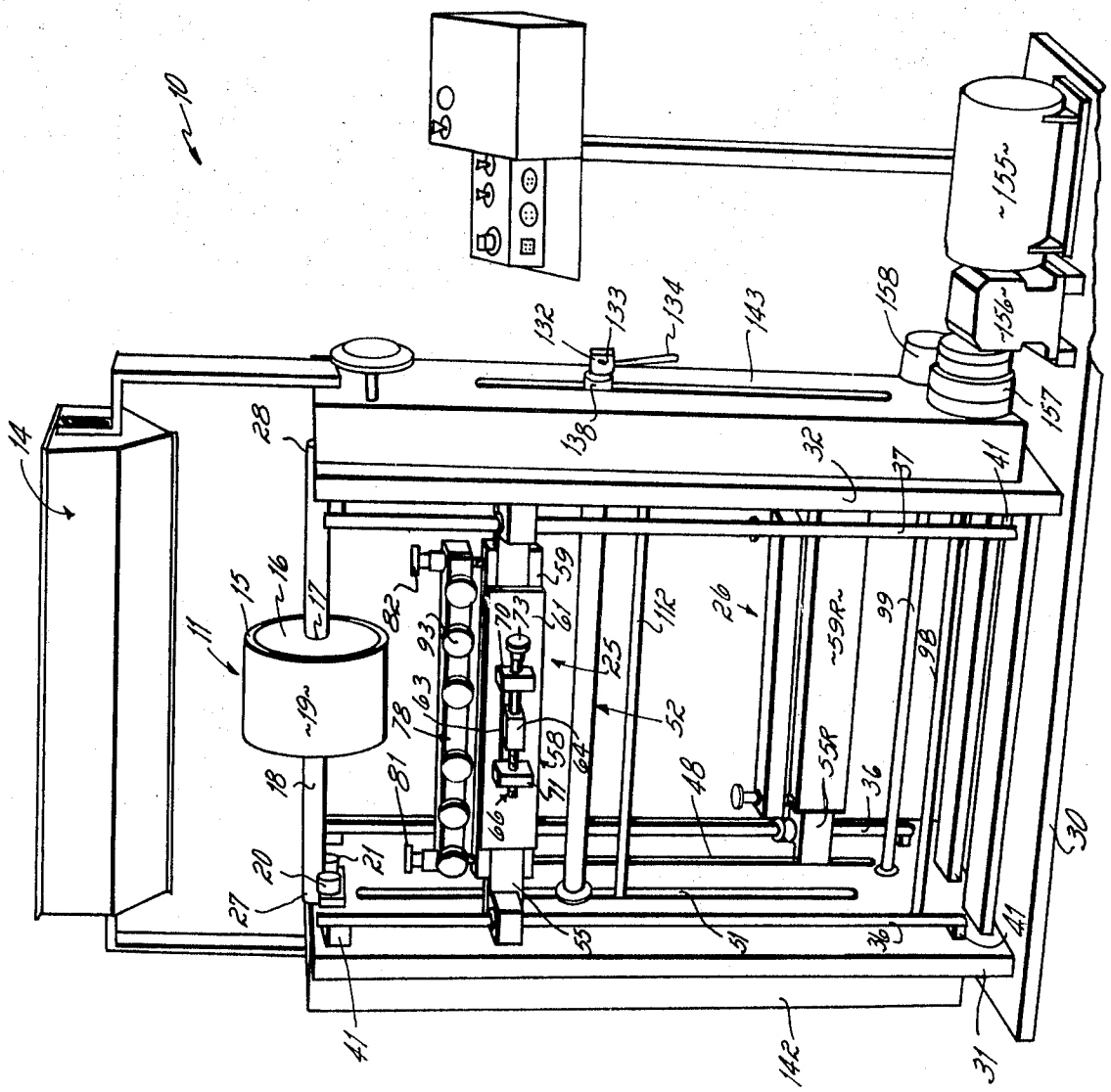


Fig. 1

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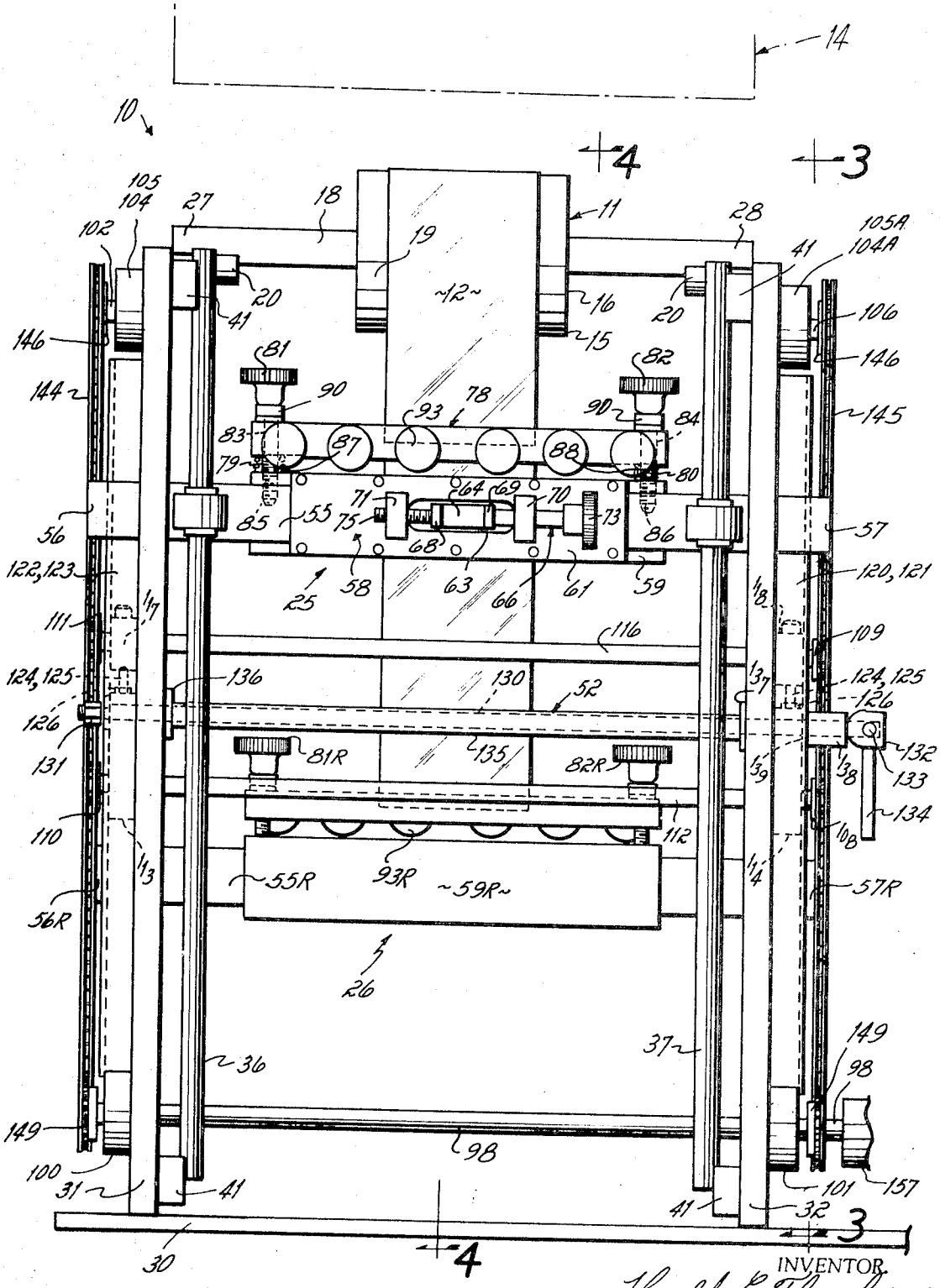


Fig. 2

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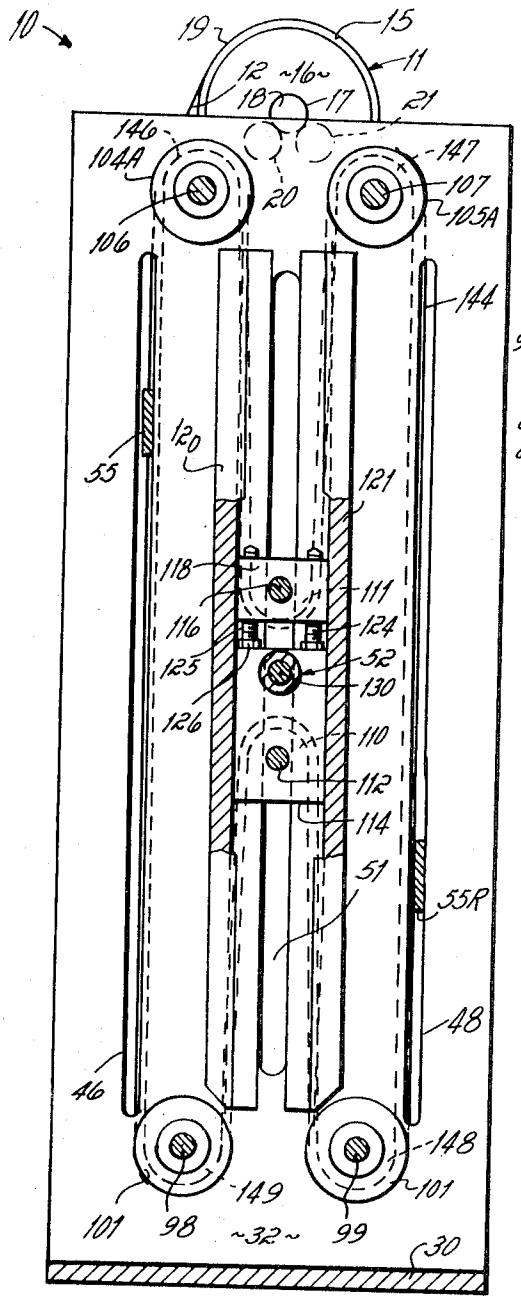


Fig. 3

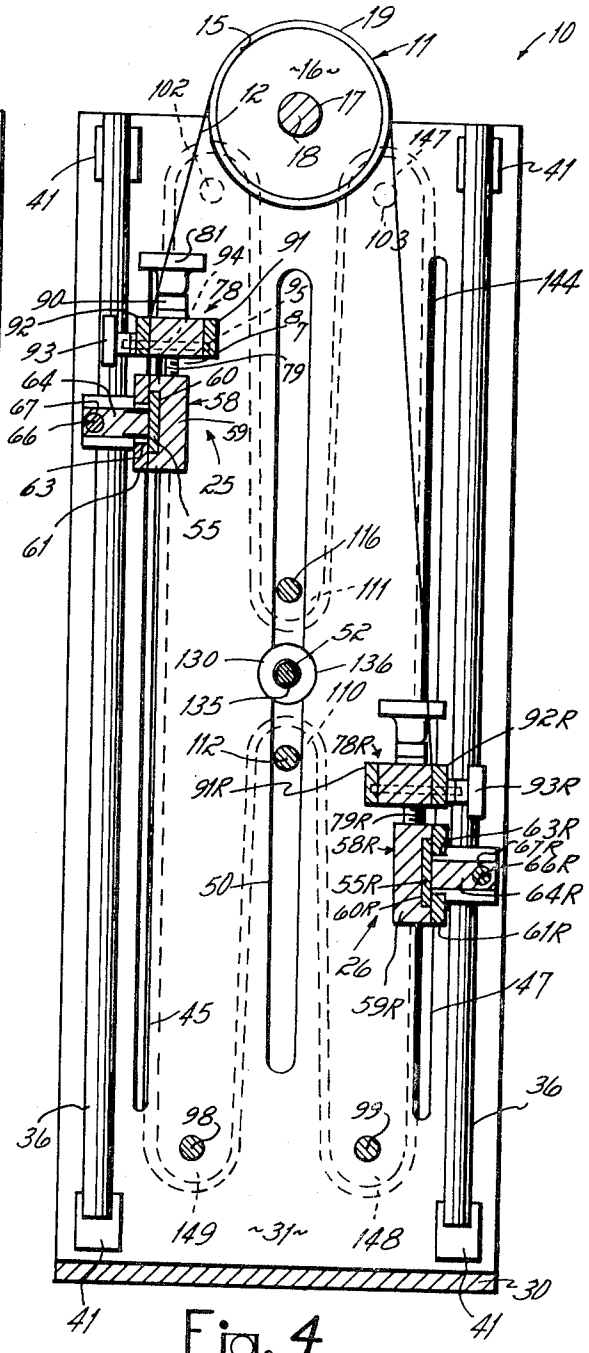


Fig. 4

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APPARATUS FOR MANUFACTURING ROTOGRAVURE PRINTING ROLL

This invention relates to printing rolls and more particularly to the manufacture of rotogravure printing rolls.

Gravure printing is a well known commercial printing process. It is essentially an intaglio printing process in which the printing plate is engraved or etched so as to have ink receiving wells or recesses in its printing face. In use, the plate is inked over its entire face and then wiped so that the ink is removed from the surface but is retained in the incised or engraved wells or recesses. When paper is then placed over or engaged with the printing face of the plate, the ink is transferred from the recesses to the paper by a combination of pressure and suction.

Rotogravure printing utilizes an engraved copper surfaced or copper jacketed cylinder carried on a web fed press. The process is commonly used for newspaper, magazine and other large scale production processes. In the printing operation, the gravure cylinder rotates through a trough of liquid ink or has the ink sprayed on it, the ink being held on the surface as well as in the etched cups. As the cylinder continues its rotation, it passes under a thin flexible steel blade or scraper, the doctor blade, which extends the entire length of the cylinder, bearing at an angle against it. The blade wipes or scrapes the ink from the surface leaving it only in the etched cups. After being wiped, the cylinder rotates further and comes in contact with the paper, which is held against it by an impression cylinder and printing takes place at that point.

An etching process, referred to as photogravure, is commonly used to apply the etched pattern to the cylinder roll. This photogravure process involves lightly covering the peripheral surface of the roll with asphaltum, an acid resist, and then exposing the surface of the asphaltum covered roll to a light pattern beamed through a photographic positive film. The light penetrates the film in selected areas and burns away or destroys the acid resist property of the asphaltum in those areas. Subsequently, the roll is etched in an acid which causes closely spaced microscopic wells or cups to be generated in the unprotected areas. For dark parts, the microscopic cups or wells which carry the ink are deeper and hold more ink and consequently apply more ink to the paper than the shallower cups or wells which print the light portions. These cups or wells are ordinarily 0.002 or 0.003 inch in depth and diameter.

Heretofore it has been the practice to expose selected areas of the asphaltum covered roll to light while protecting other areas against exposure by wrapping and taping positive photographic film around the roll. The roll was then mounted on an arbor supported so as to allow the roll to rotate freely about a horizontal axis. A sheet of mylar or other transparent plastic was then draped over the top of the roll and the ends were attached to two platens. By moving one platen away from the roll while lifting the other toward the roll, the mylar sheet causes the roll to rotate. Simultaneously a beam of light was directed onto the film at the point where it contacted the roll. Movement of the platens was effected by four vertical screws and nuts. Two of these nuts were attached to each platen so that upon rotation of the screws, two nuts effected upward movement of one platen while simultaneously the other two effect downward movement of the other.

This invention is partially predicted upon the concept of utilizing the film strip itself rather than an auxiliary strip of transparent material to effect rotation of the asphaltum coated roll. By attaching its ends to movable platens, and providing the platens with both longitudinal and lateral adjustments, the image on the film may be adjusted in length to exactly correspond to the circumference of the roll. It may also be adjusted laterally so that it is precisely located in a predetermined position on the roll. The practice of this concept or technique in the manufacture of the roll has the advantage of minimizing the set-up time required to expose the asphaltum on the roll to the image on the film. It also has the advantage of minimizing the operator time involved in manufacturing the roll and thus the cost of the printing roll.

The machine of this invention upon which the asphaltum coated roll is exposed to the image of the film comprises an arbor supporting platform upon which two platens are vertically movable. The ends of these platens are attached to endless chains which are adjustable so as to vary the overall distance between the platens. Film clamps are secured to these platens and are adjustable laterally relative thereto so that the film may be both adjusted in length and lateral position relative to the roll. Tension in the chains is adjustable so that there is no play or looseness with the result that the platens move evenly and in synchronization. The film tension therefore does not vary and the film cannot become misaligned on the roll. This is a distinct advantage over screw and nut drives where wear and linear movements are uneven.

Additionally, this machine has the advantage of enabling a photographic positive film strip to be very quickly and easily located over and registered upon the circumference of a rotogravure roll so as to minimize set-up time as well as errors which have heretofore caused production errors and scrappage.

These and other objects and advantages of this invention will be more readily apparent from the following description of the drawings in which:

FIG. 1 is a perspective view of a machine for carrying out one step in the process of manufacturing a rotogravure roll.

FIG. 2 is a front elevational view of the machine of FIG. 1.

FIG. 3 is a cross-sectional view, partially broken away, taken along line 3—3 of FIG. 2.

FIG. 4 is a cross-sectional view of the machine taken on line 4—4 of FIG. 2.

Referring to the drawings there is illustrated a machine **10** for exposing a coating over the surface of a gravure roll **11** to a pattern of light through a positive film **12**. Prior to being mounted on the machine **10** and exposed to the light, the gravure roll or printing roll **11** undergoes a series of processing steps all of which are conventional and are known in the prior art. Specifically, the roll **11** is prepared for application of a printing pattern by having a copper jacket or coating **15** applied to the peripheral surface of a steel cylinder or drum **16**. This drum has a central axial aperture **17** which enables it to be mounted upon a shaft or arbor **18**. After application of the copper, the peripheral surface of the roll is turned to eliminate all eccentricity and taper and is subsequently ground and polished. A coating of light sensitive acid resist, as for example, asphaltum, is then applied to the peripheral surface **19** of the roll. When subjected to light, this acid resist or asphaltum breaks down or "burns away" to expose the copper therebeneath. In order to enable a predetermined pattern to be applied to the surface of the roll, or etched from it, selected areas of asphaltum on the roll are exposed to light to expose the copper therebeneath preparatory to subsequent etching. The remaining acid resist or asphaltum then protects the copper in those areas in which it was not exposed to light so that the acid etchant has no effect on those unexposed areas while the exposed area is etched. The etching consists of the acid attacking the copper and pitting it to generate small closely spaced cups or wells approximately 0.002 inch in depth and 0.002 inch in diameter throughout the printing area. The acid bath etching process is conventional and therefore need not be described in detail.

The invention of this application concerns the exposure of selected peripheral surface areas of the acid resist coated roll to light so as to breakdown or burn away the asphaltum. To this end, a positive photographic film **12** is draped over the arbor mounted roll and is attached at its opposite ends to a pair of vertically movable platens **25, 26**. The ends of the arbor **27, 28** are supported for rotation on bearing blocks or rollers **20, 21** so that the roll **11** may be rotated by frictional drive of the film **12**. This frictional drive is accomplished by lifting or raising one platen (**25** or **26**) while simultaneously lowering the other platen (**25** or **26**), all the while maintaining a predetermined tension in the film **12**. As the roll is rotated by the film **12**, the film is exposed to a source of light **14**

mounted above the roll. Thereby the selected areas of the asphaltum unprotected by the film are exposed to the light with the result that the asphaltum in those areas breaks down or "burns away."

The machine for supporting the roll 11 and the film 12 so as to enable the film to frictionally drive the roll comprises a base plate 30 to which a pair of side plates 31, 32 are welded or otherwise fixedly secured. The base plate 30 and side plates 31, 32 thus constitute a frame of the machine.

To support the platens 25 and 26 for vertical movement on the frame, a pair of guide rods 36, 37 are secured to the front inside wall of each side plate 31, 32, respectively. Similarly, a rear pair of guide rods 36, 37 are secured to the inside of the side plates 31 and 32, respectively, near the rear of the wall. Each of the rods 36 and 37 is attached to the wall by bolts (not shown) which pass through spacer blocks 41 located between the rod and the wall. The rods are thus spaced inwardly from the walls on which they are fixedly mounted.

There is a front platen guide slot 45–46 in each side plate 31–32, respectively, and a rear platen guide slot 47–48 in each plate 31–32. These slots are both vertical slots located adjacent the front and rear edges of the plates. The front platen 25 extends between and has its ends slidable in the front slots 45 and 46. Similarly the rear platen 26 extends between and has its ends slidable in the rear slots 47 and 48. In addition to the front and rear slots in each side plate there is also a medial vertical slot 50–51 in each plate 31–32. This central or medial slot functions as a guideway for a vertically adjustable clamping bar 52 as is explained more fully hereinafter.

The two film carrying platens 25 and 26 are identical, and therefore only one, 25, will be described in detail. Corresponding parts of the other, 26, have been designed by the same numerals followed by the suffix "R" so as to distinguish the two in the drawings.

Each platen comprises a carrier bar 55 which extends for the width of the machine and has end sections 56–57 which protrude through slots 45–46 so as to be located outboard of the side plates 31–32. As is explained more fully hereinafter, these end portions 56–57 are attached to chain drives which effect vertical movement of the carrier bar.

A slide 58 is movable laterally over the carrier bar 55. This slide comprises a backing plate 59 in the front face of which there is a transverse recess 60. The recess 60 conforms in height and width to the height and thickness of the carrier bar 55 over which the backing plate is slidable. A cover plate 61 fits over the front face of the backing plate and is bolted to the front face of it. Thereby a channel or slideway is defined by the recess 60 in the backing plate and the rear face of the cover plate 61. There is a longitudinal aperture 63 formed in the cover plate. A bracket 64 welded or otherwise fixedly secured to the front of the carrier bar 55 protrudes through this aperture 63.

To effect lateral sliding movement of the slide 58 relative to the carrier bar 55, an adjustment screw 66 extends transversely through a transverse aperture 67 in the bracket 64. A pair of collars 68–69 are nonrotatably keyed to the shaft 66 so as to preclude axial movement of the shaft 66 relative to the bracket 64. The adjustment screw 66 extends through and is rotatably supported in a block 70 fixedly attached to the front face of the cover plate 61 and is threaded into a threaded aperture in a second block 71 attached to the front face of the cover plate 61. A knob or handle 73 is nonrotatably keyed to one end of the shaft 66 so as to enable the shaft to be rotated.

Upon rotation of the handle 73, the shaft 66 is rotated. Rotation of this shaft causes the threaded end section 75 of the shaft 66 to be threaded into the threaded aperture of the block 71. Since the shaft is held against axial movement relative to the bracket 64 by the collars 68 and 69, rotation of the shaft causes the bracket 71 to move axially relative to the shaft and thus relative to the bracket. Thereby, the slide 58 including the cover plate 61 and backing plate 59 are caused to move laterally relative to the carrier bar 55.

A vertically adjustable film clamping bar 78 is mounted upon the backing plate 59 by a pair of adjustable screws 79, 80. These screws have handles or knobs 81, 82 nonrotatably keyed to their upper ends. They extend downwardly through unthreaded vertical apertures 83 and 84 of the clamping bar and are threaded at the lower ends into threaded apertures 85, 86 in the top of the backing plate 59. Compression springs 87–88 are located over the screws 79 and 80 between the bottom of the clamping bar and the top of the backing plate so as to hold the clamping bar out of contact with the backing plate while still enabling the bar to be adjusted vertically relative thereto. Preferably spacing washers 90 are located between the bottom of the handles 81, 82 and the top of the clamping bar 78 to facilitate rotation of the handles and the attached screws relative to the bar.

In the preferred embodiment illustrated in the Figures, a clamping plate 92 is secured to the front face of the clamping bar 78 and a back-up plate 91 is secured to the rear face. These plates 92 are clamped to the bar 78 by a series of handled screws 93 which pass through unthreaded apertures 94 in the plate 92 and bar 78 and are threaded into threaded apertures 95 of the plate 91. Also in the preferred embodiment there are six handled screws 93 for clamping the plates 91, 92 to the bar 78. To clamp the film between either the plate 91 or 92 and bar 78, the handles 93 are loosened and the end of the film 12 is inserted therebetween. Thereafter, the handles of the screws are rotated and threaded into the threaded apertures 95 so as to clamp the plates 91, 92 to the bar 78 with the film tightly sandwiched therebetween.

Synchronous vertical movement of the carrier bars 55, 55R and thus of the platens 25 and 26 is effected by parallel chain drives located on opposite sides of the machine. These drives comprise a pair of lower sprocket shafts 98 and 99 which extend between the through the side plates 31, 32 and are journalled in journal blocks 100, 101 on the outboard side of the plates. Additionally, there are a pair of idler or stub shafts 102–103 rotatably journalled in journal blocks 104–105 on the outboard side of the side plate 31 and another pair of stub shafts 106, 107 rotatably journalled in similar journal blocks 104A, 105A secured to the outboard side of the side plate 32. A pair of chain drive sprockets are secured to the outer ends of each of the shafts 98, 99. A single sprocket is keyed to the outer end of each of the stub shafts 102, 103, 106 and 107.

In addition to the heretofore described sprockets for supporting the chain drives on each side of the machine, there is another pair of sprockets 108, 109 and 110, 111 located approximately midway up each side for supporting the chain drive. The lowermost ones of these sprockets 108, 110 are nonrotatably keyed to an idler shaft 112 which extends through the vertical slots 50, 51 in the side plates 31, 32. The ends of this shaft 112 are journalled in vertically movable slide blocks 113, 114. Similarly the upper sprockets 109, 111 are nonrotatably keyed to an idler shaft 116, the ends of which extend through the slots 50, 51 and are rotatably journalled in a pair of slide blocks 117, 118.

Referring now to FIG. 3, it will be seen that the slide blocks 114 and 118 on one side of the machine are vertically slidable within a pair of trackways 120, 121, welded or otherwise fixedly secured to the side plate 32. Similarly, the slide blocks 113 and 117 are vertically slidable within trackways 122, 123 secured to the other side plate 31. Normally the slide blocks 114 and 118 move vertically together and to that end they are bolted together. However, adjustment screws 124, 125 and nuts 126 threaded thereon facilitate vertical adjustment of the slide block 118 relative to the block 114. This adjustment enables slack in the chain to be taken up as is explained more fully hereinafter. Similarly, adjustment screws 124, 125 and nuts 126 threaded thereon facilitate vertical adjustment of the slide block 117 relative to the slide block 113.

The clamping bar 52 facilitates vertical adjustment of the slide blocks 114, 118 and 113, 117 relative to the slideways 120, 121 and 122, 123, respectively. This clamping bar comprises a central shaft 130 which extends between and through

the vertical slot 50, 51 in the side plates 31 and 32, respectively. A lock nut 131 is threaded over one end of this shaft and at the opposite end a cam 132 is pivotaliy secured to the shaft by a pivot pin 133. A handle 134 is rigidly attached to this cam. There is a flanged sleeve 135 mounted over the shaft 130 between the side plates 31, 32. Flanges 136, 137 on the ends of the sleeve bear against the inside walls of the side plates 31, 32. There is also a sleeve 138 slidably mounted over the end of the shaft 130 between the cam 132 and the outside of the side wall 32. The inside edge 139 of this sleeve 138 bears against the slide block 114. The cam 132 is so shaped that upon upward movement of the handle 134 from the position illustrated in FIG. 2 to the position in which the handle is parallel to the axis of the shaft 130, the shaft 130 is loosened relative to the sleeve 135 and 138. Moving the handle downwardly to the position illustrated in FIG. 2, causes the shaft 130 to be pulled to the right as viewed in FIG. 2 and the sleeve 138 to be pushed to the left. The radius on the cam is such that this movement causes the shaft 130 to be clamped to the side walls 31, 32 of the machine frame.

There is one endless drive chain 144, 145 on each side of the machine. Referring to FIGS. 3 and 4, it will be seen that each chain 144, 145 extends from the front platen 25 to which it is attached over a sprocket 146 and beneath the sprocket 109 or 111. From the sprockets 109 or 111 each chain passes over an upper rear sprocket 147 down to a point of attachment to the platen 26 and from there beneath a sprocket 148 fixed to each end of the shaft 99. Each chain then passes up and over the sprocket 110 or 108 and then beneath a sprocket 149 fixed to each end of the shaft 98, back to the platen 25. Both the front platen 25 and the rear platen 26 are rigidly attached at their ends (by means not shown) to the chains 144 and 145. Therefore, upon movement of the chains one platen 25 is caused to move vertically upwardly while the other 26 is caused to move downwardly or vice versa depending upon the direction of chain movement.

To adjust the tension of the chains and thereby take slack out of the chain, the two sprockets 110–111 are vertically movable toward and away from each other by adjustment of the screws 124 and 125 and lock nuts 126. Adjustment of these screws causes the slide blocks 118 and 114 which carry the sprockets to be moved toward or away from each other and thereby the sprockets to be moved toward or away from each other.

To preclude accidents and improve the appearance of the machine 10, the chains 144, 145 and associated sprockets are enclosed by housings 142, 143 shown only in FIG. 1.

Drive of the chains and thus the attached platens is imparted by an electric drive motor 155 through a gear reduction unit 156 and electric clutch 157. The output shaft of the clutch 157 is coupled directly to the drive shaft 98. When the clutch is engaged, the motor is operative to drive the shaft 98 and the sprockets 149 keyed thereto. These sprockets in turn affect drive of the chains and the platens.

There is also an electric brake 158 coupled to the shaft 99. When this brake is engaged, this shaft 99 is locked against rotation. This lock serves to enable one platen 25 to be moved independently of the other platen 26 so as to facilitate adjustment of the tension in the film strip 12 extending between the two platens. To this end, when the brake 158 is locked so that the shaft 99 cannot rotate, the clamp bar 52 is unlocked. Thereby the slide blocks 114 and 118 and the blocks 113 and 117 are free to move vertically in their respective slideways. If under this condition the drive motor is jogged, it effects movement of the drive shaft 98. If the drive shaft 98 is rotated in a counterclockwise direction as viewed in FIG. 4, while the brake 158 is locked, (so that the shaft 99 cannot rotate) the slide blocks 114–118 and 113–117 must move upwardly and the platen 25 moves downwardly. The platen 26 remains stationary because of the engagement of the brake 158. Alternatively, the platen 25 can be moved upwardly by jogging the motor so as to effect clockwise movement of the shaft 98 as viewed in FIG. 4 while the brake 158 is locked. This movement effects downward movement of the slide blocks 114–118 and 113–117 and upwardly movement of the platen 25 while the platen 26 remains stationary. If a strip of film 12 extends between the two platens when this independent movement of the platen 25 is affected, tension in the film may be either increased or decreased depending upon the direction of motor rotation.

Near the top of each of the side plates there are a pair of horizontally spaced supporting rollers 20–21. These rollers are located on the inside of the side walls 31 and 32 slightly beneath the top surface of the walls. When the shaft 18 is supported on these rollers it is free to rotate and its ends abut the inside of the side walls 31 and 32 so as to hold the shaft against lateral movement. Alternatively, collars may be mounted upon the shaft and abutted against the radial surface of the rollers to prevent lateral shifting of the shaft and thus of the supported roll 10.

OPERATION

In operation, a copper jacketed gravure roll 11 which has had its peripheral surface ground and polished and has had a coating of asphaltum or other acid resist material applied to the polished surface is mounted upon the arbor shaft 18. The shaft 18 is then supported upon the rollers 20–21 and is restrained against lateral movement.

A strip of positive photographic film is then draped over the top of the roll. This film strip has a pattern applied thereon which corresponds in length to the circumference of the roll. When transferred to the roll this pattern must match up at its ends within 0.002 to 0.003 inches with the circumference of the roll 10, if the roll is to subsequently print a continuous pattern. If the image is too short, so that there is a gap left on the roll, the roll must either be mechanically hand etched after the chemical etching process is completed, or it must be scrapped. Alternatively, if the image is too long and overlaps on the roll, the patterns will not match up and the roll will have to be scrapped.

After the film is draped over the roll, its ends are clamped by the clamping plates 92, 92R of clamping bars 78, 78R carried by the platens 25 and 26. The handle 134 of the clamping bar 52 is then rotated so as to unclamp the bar 52 and the attached slide blocks from the frame of the machine so that it is free to move vertically. The brake 99 is then locked and the motor 155 jogged so as to move the platen 25 downwardly while the platen 26 remains stationary, thereby taking slack out of the film strip. When the film is properly tensioned, the electric brake 158 on shaft 99 is turned off so that the shaft 99 is free to rotate and the handle 134 actuated so as to clamp the shaft 52 and the attached sprocket supporting shafts 112 and 116. A trial or practice run is generally made by turning on the motor 155 while the light source 14 is left off. The film is then run over the roll to determine if the registration points on the roll and the film match and to insure that the film is running perfectly perpendicular to the axis of the roll. If the film is not perfectly perpendicular, the handles 73, 73R are rotated so as to cause one or both of the platen slides 58 to be adjusted laterally. In the event that the ends of the film do not quite match up, tension in the film may be slightly increased or decreased so as to provide perfect registration of the ends of the image on the film with the circumference of the roll. Usually this match-up only involves a few thousandths of an inch.

After it has been determined that the film and the roll are in perfect registration, the light source 14 is turned on and the operation of the motor 155 initiated. At this time the brake 158 is off and the bar 52 is locked to the frame of the machine. The platens 25 and 26 then move in perfect synchronization, one moving upwardly and the other downwardly so as to cause the film to be moved over the surface of the roll and to frictionally drive the roll in rotation. The speed at which the roll is rotated is determined by the speed of the motor and the gear reduction unit 156. This is in turn adjusted to correspond with

the degree of exposure required to break down or burn off the asphaltum or acid resist coating on the roll.

After complete exposure of the peripheral surface of the roll to the light source, the motor **155** is turned off and the film strip **12** removed from engagement with the roll. The roll is then transferred to an acid bath where the areas of the roll unprotected by the asphaltum or acid resist are etched away to form ink receiving wells. These wells are generally microscopic in appearance, are closely spaced, and are generally 0.002–0.003 inch in diameter.

After the acid etching is completed, the surface of the roll is then cleaned and in most instances is then coated with a hard chrome finish to make it more wear resistant. The roll is then ready for use as a printing roll. When so used, the cylinder generally rotates through a trough of liquid ink or has the ink sprayed on its surface. The ink is then held on the surface of the roll as well as in the etched cups. As the cylinder rotates, it passes a thin flexible steel blade or scraper, the doctor blade, which extends across the entire width of the cylinder and wipes or scrapes the ink from the surface leaving it only in the etched cups. The cylinder then rotates further and comes into contact with the paper which is held against it by an impression cylinder. Printing takes place at that point after which the roll then continues its rotation back into the ink trough or past the ink spray nozzles.

The primary advantage of the gravure roll manufacturing technique or process and the apparatus heretofore described, is the ease with which it enables the photographic positive film to be located over the printing roll for exposure of the acid resist coating to a light source. This machine and process enables the film to be accurately located on the roll with a very minimum of operator set-up time because the machine is not subject to uneven operation of the platens such as often occurs with screw and nut type drives. The film always runs true on the roll with the result that it accurately reproduces the image of the film. Scrappage or poor quality rolls are therefore minimized or eliminated.

While I have described only a single preferred embodiment of my invention, those persons skilled in the art to which this invention pertains will appreciate numerous changes and modifications which may be made without departing from the spirit of my invention. Therefore, I do not intend to be limited except by the appended claims:

Having described my invention, I claim:

1. Apparatus for manufacturing a rotogravure printing roll which comprises

means for supporting the roll for rotation about a horizontal axis,

a pair of linearly movable platens located on opposite sides of said axis, each of said platens being movable in a single plane,

means for attaching opposite ends of a photographic film to each of said movable platens when the central section of the film between the ends extends over and frictionally contacts the roll,

means for adjusting the tension of the film between the platens so as to vary the length of the film,

means for directing a light beam onto the roll through the photographic film and

drive means for synchronously moving one platen away from the roll and the other platen toward it while maintaining a predetermined tension on the film, said drive means being operative to frictionally drive the roll in rotation as a consequence of frictional contact between the film and the roll at a rate determined by the linear speed of the platens to which the ends of the film are attached.

2. The apparatus of claim **1** which further includes means for adjusting the distance of at least one platen from the roll after attachment of the ends of the film to the platens so as to vary the tension in the film and cause the image on the film to exactly match the circumference of the roll.

3. The apparatus of claim **2** which further includes means for adjusting the film attaching means on the platens in a direction parallel to the axis of the roll after attachment of the ends of the film to the platens so as to precisely position the film laterally over the peripheral surface of the roll.

4. The apparatus of claim **1** wherein said platen drive means comprises a pair of endless chains, each one of said pair of chains being attached to both of said platens.

5. The apparatus of claim **4** wherein each of said chains extends over a pair of sprockets located adjacent said roll rotation axis and a second pair of sprockets located remote from said roll rotation axis, each of said chains further passing around a pair of adjustable sprockets movable together toward and away from said roll.

6. The apparatus of claim **5** wherein said adjustable sprockets are adjustably movable toward and away from each other to vary the tension in the chain and thereby eliminate slack from it.

7. The apparatus of claim **5** wherein said pair of adjustable sprockets of each of said drive means are mechanically interconnected so that they are movable together toward and away from said roll.

8. The apparatus of claim **7** wherein said mechanical interconnection between said pair of adjustable sprockets comprises means for clamping said adjustable sprockets against movement.

9. The apparatus of claim **8** which further includes a brake operatively connected to one of said sprockets for locking it against rotation during adjusting movement of said adjustable sprockets.

10. The apparatus of claim **9** which further includes a clutch operatively connected to another of said sprockets and a drive motor for effecting rotation of said other drive sprocket through said clutch.

11. The apparatus of claim **10** wherein said brake is an electric brake and said clutch is an electric clutch and further including a control panel for selectively effecting engagement of said clutch or said brake or for simultaneously effecting engagement of both said clutch and said brake.

12. Apparatus for manufacturing a rotogravure printing roll which comprises

a frame including a pair of side plates,

bearing means for supporting the roll between said side plates for rotation about a horizontal axis,

a pair of vertically movable platens extending between said side plates, one of said plates being located in front of said axis of rotation and the other plate being located behind said axis of rotation,

clamping means for attaching opposite ends of a photographic film to each of said movable platens when the central section of the film between the ends extends over and contacts the roll,

means for directing a light beam onto the roll through the photographic film, and,

drive means for synchronously moving one platen away from the roll and the other platen toward it while maintaining a predetermined tension on the film so as to frictionally drive the roll in rotation at a rate determined by the linear speed of the platens to which the ends of the film are attached.

13. The apparatus of claim **12** wherein said platen drive means comprises a pair of endless chains, each one of said pair of chains being attached to both of said platens.

14. The apparatus of claim **4** wherein each of said chains extends over a pair of sprockets located adjacent said roll rotation axis and a second pair of sprockets located remote from said roll rotation axis, each of said chains further passing around a pair of adjustable sprockets adjustably movable together toward and away from said roll.

15. The apparatus of claim **14** wherein each pair of adjustable sprockets is mounted upon a slide block, said slide blocks are mechanically interconnected so that they are movable together toward and away from said roll.

16. The apparatus of claim **15** which further comprises means for clamping said slide blocks against movement relative to said frame.

17. The apparatus of claim 16 which further includes a brake operatively connected to one of said sprockets for locking it against rotation during adjustment of said slide blocks.

18. The apparatus of claim 17 which further includes a clutch operatively connected to another of said sprockets and a drive motor for effecting rotation of said other drive sprocket through said clutch.

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