

Nov. 17, 1931.

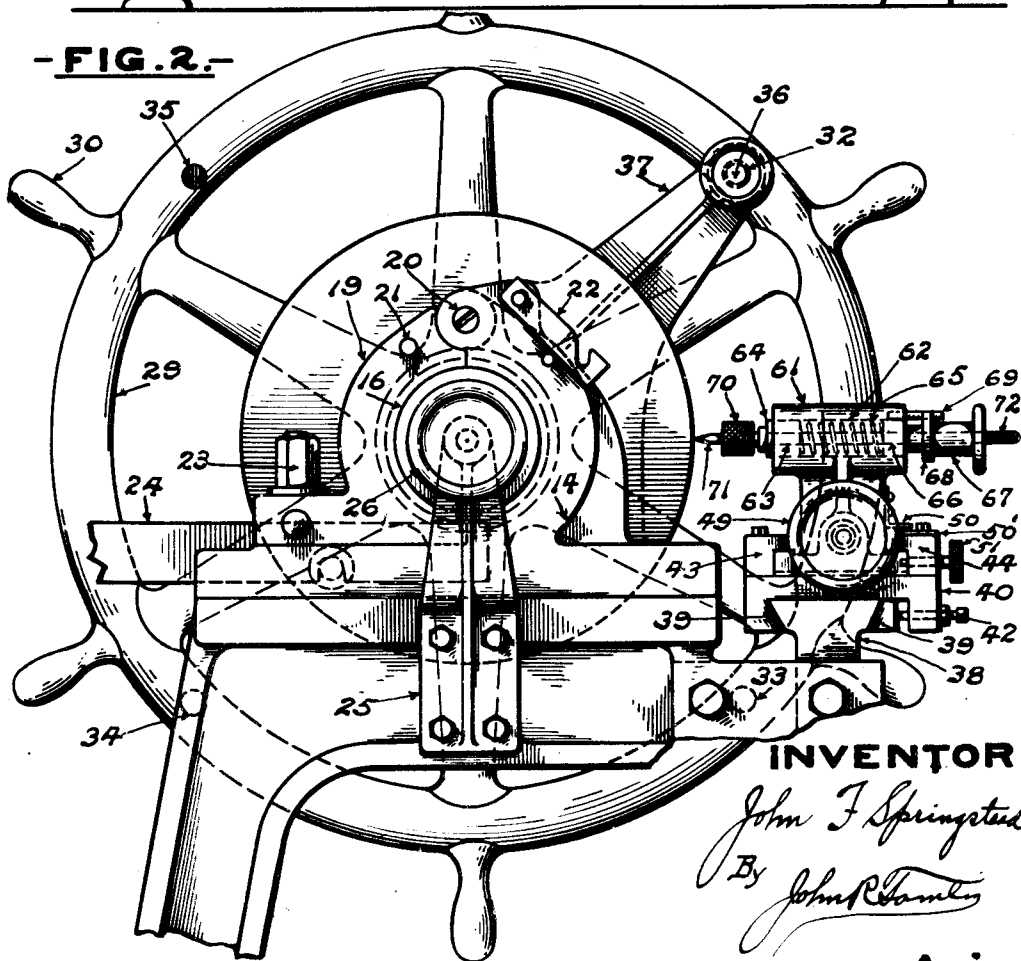
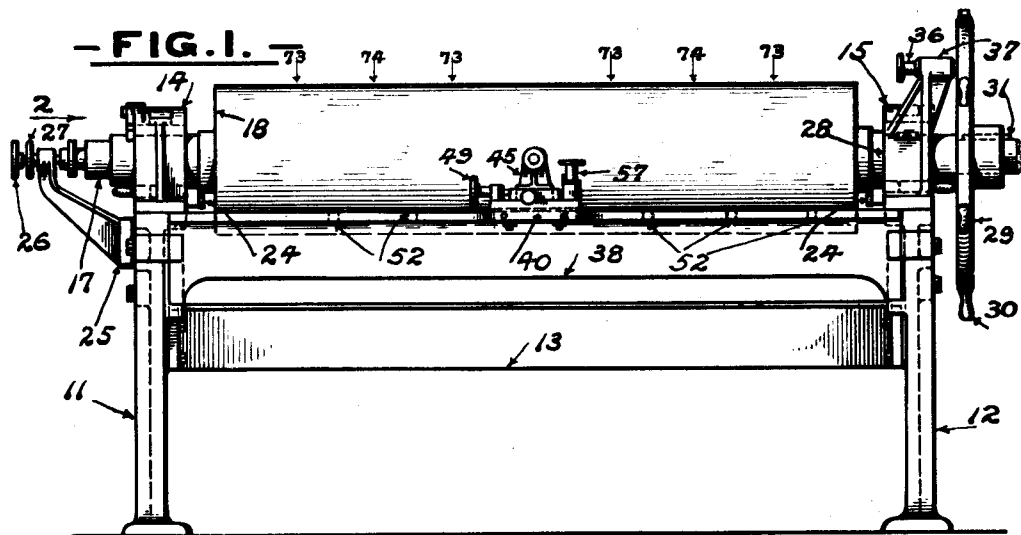
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1,832,255

MEANS FOR MARKING CYLINDERS USED IN ROTARY PHOTOGRAVURE PRINTING

Filed Dec. 6, 1928

2 Sheets-Sheet 1



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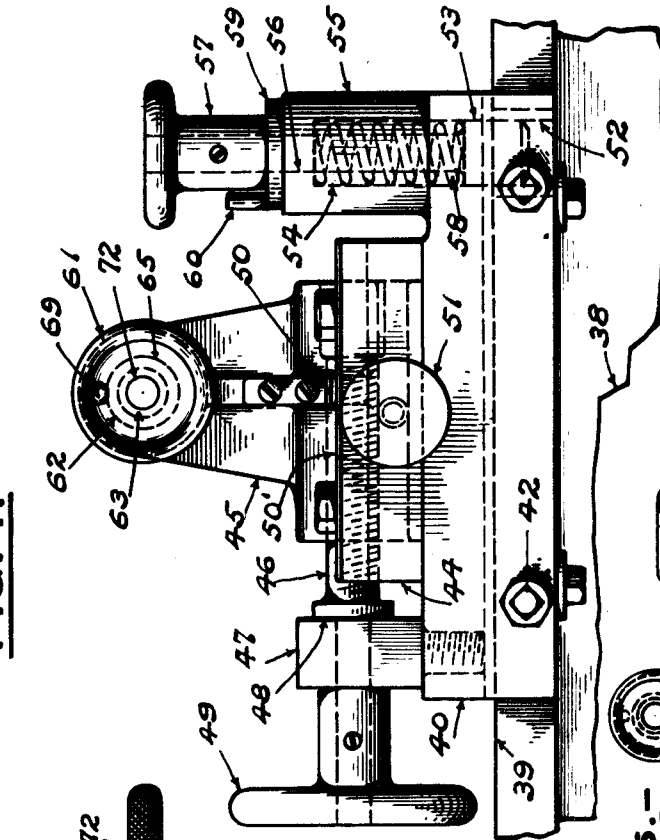
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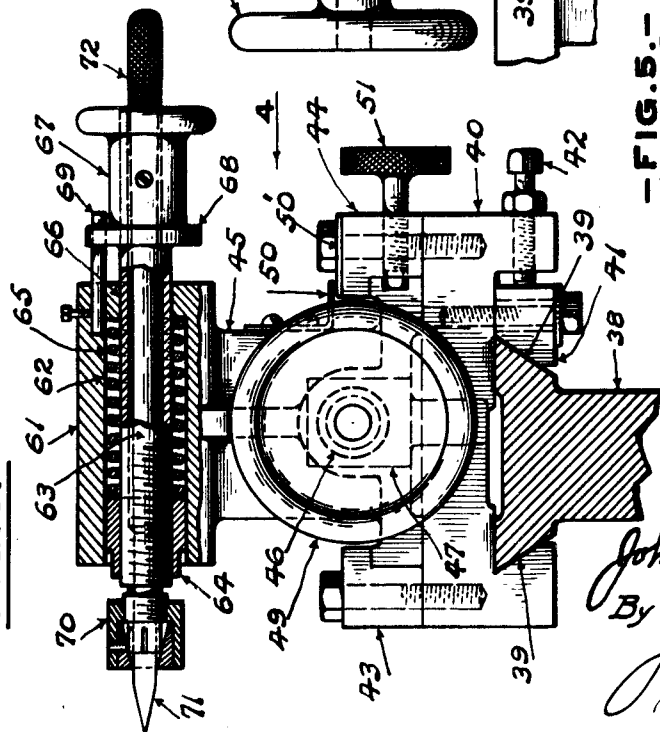
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- FIG. 4.-



- FIG. 3.-



UNITED STATES PATENT OFFICE

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MEANS FOR MARKING CYLINDERS USED IN ROTARY PHOTOGRAVURE PRINTING

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This invention relates to the preparation of printing cylinders used in rotary photogravure printing on paper or similar material in web form, and provides a means for accurately placing register marks on the cylinder to guide the operator in positioning the tissue sheet from which the cylinder is etched.

Accurate register is important in all rotary photogravure printing, but in multi-color work, wherein four separate impressions in different colors are usually made, a separate cylinder is used for each color and the images that are etched on the several cylinders must be located very accurately in order to insure proper register in the printing.

The especial object of the invention is to provide a machine for marking cylinders used in rotary photogravure printing, by means of which the cylinders may be supported and accurately marked longitudinally and circumferentially with suitable register marks whereby the tissue sheets carrying the forms, may be placed on the peripheral surface of the cylinders in the correct positions to produce accurately registered printing.

It is also an object of the invention to provide a machine for marking cylinders used in rotary photogravure printing that is of generally improved construction, whereby it will be simple and durable, as well as convenient, practical, serviceable and efficient in its use.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts, and in the details of construction hereinafter described and claimed, it being understood that various changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed without departing from the spirit of the invention.

In the accompanying drawings:

Figure 1 is a front view of the marking machine showing a cylinder in position for marking,

Figure 2 is an end view of a portion of the machine showing details of the dividing and

marking mechanism and their relation to the cylinder,

Figure 3 is an enlarged view, partly in section showing the marking head,

Figure 4 is a view of the marking head as seen from the front and in the direction of arrow 4 of Figure 3, and

Figure 5 shows a modified arrangement of the marker support.

Referring to the drawings, 11 and 12 indicate side members of the machine frame and 13 indicates a brace member. Bearing blocks 14 and 15 have bearings 16, which support the shaft 17 of the cylinder 18. These bearings have sections 19, hinged at 20 so they may be opened to permit convenient placing of the cylinder in the machine and its convenient removal. These sections have pins 21, which may be engaged by hooks 22, to hold the sections in the open position. During the operation of the machine the sections are held closed by screws 23 which secure them to the bearing blocks 14 and 15.

Skids 24 are provided whereon the shaft 17 may be rested and which guide it into the bearings.

The bracket 25 is secured to the frame member 11 and is provided with a hand screw 26, threaded therein and in alignment with the shaft 17. A locking wheel 27 is threaded on the screw 26. The shaft 17 is shouldered at 28 so that when the hand screw 26 is tightened the shoulder 28 is pressed against the end of the bearing block 15 and the cylinder 18 is thus held against endwise motion in either direction. The locking wheel when tightened serves to prevent loosening of the screw 26 when the cylinder is turned.

A handwheel 29 having handles 30 is fitted to the shaft 17 and secured thereto by the key 31. A convenient means is thus provided for manually rotating the cylinder.

The handwheel is provided with holes 32, 33, 34 and 35, which are engaged by a pin which slides in a bracket 37 secured to the bearing block 15. These holes are placed at equidistant points in the rim of the wheel 29 and serve to accurately position the cylinder for marking.

The frame member 38 has a carriage way 39, formed thereon and is secured to the side frame members 11 and 12, being so placed that the carriage way is parallel to the axis of the bearings 14 and 15.

A carriage 40 is fitted to slide on the carriage way 39 and is provided with a block 41, adjustable by means of screws 42, to take up wear. Ways 43 and 44 are secured to the carriage 40 and form a slide way for the marker slide 45. An adjusting screw 46 is threaded into the marker slide and passes through a clearance hole in the post 47, secured to the carriage 40. The screw 46 has a shoulder 48 and is fitted to a handwheel 49. Means are thus provided for adjusting the marker slide 45 longitudinally of the carriage, and a pointer 50 secured to the marker slide indicates its position with respect to the carriage, on a graduated scale 50', secured to the carriage. A lock screw 51 serves to lock the marker slide to the carriage when desired.

The carriage 40 is freely slidable on the carriage way 39, but means are provided for quickly locating and holding it in predetermined positions. These means comprise holes 52 suitably located in the carriage way, that are engaged by a plunger 53 which fits them accurately. The plunger 53 operates in a hole 54 bored in the cylindrical boss 55 of the carriage 40 and has a stem 56 which passes through the boss and is secured to a knob 57.

A spring 58 presses the plunger 53 down and into the hole 52 when it is aligned therewith. The knob 57 is formed with a collar 59 having a slot which engages with a pin 60 secured to the boss 55. When the knob is lifted to raise the plunger the slot in the collar 59 slides along the pin 60, and when the collar is raised above the pin it may be rotated so that the collar bears on the top of the pin and the plunger is held out of engagement with the hole 52.

The marker slide 45 is formed with a cylindrical portion 61, having a bore 62. A hollow marker spindle 63, has a collar 64, which is fitted to slide in the bore 62, and which forms a seat for the spring 65, the other end of which bears against the bottom of the bore 62. A hole 66, forms a rear guide for the spindle 63, which is provided with a knob 67, secured thereto and having a collar 68, slotted to clear the pin 69, held in the marker slide.

On the opposite end of the spindle 63, a chuck 70 is fitted and serves to hold the marker 71. Various kinds of markers may be used but the one preferred is a stylus made from a steel rod one end of which has a slightly rounded point that is hardened and polished. The marker 71 extends through the spindle 63 and is knurled at 72 for convenience when setting it in position.

In the modified form of the marker support shown in Figure 5, the carriage 140 is shortened and the marker slide 145 is fitted to slide on the carriage way 39. The marker slide is movable with respect to the carriage, by turning the handwheel 149 which is secured to the screw 146 threaded into the marker slide 145, and having a collar 148 which engages a bracket 147 secured to the carriage 140. In this form the pointer 150 is preferably secured to the carriage and the graduated scale 150' to the marker slide. A lock screw 151 provides means for locking the marker slide to the carriage way. In other details this form is the same as that shown in Figure 4.

In the preparation of cylinders for photo-gravure printing, the form for each page is printed on a sheet of sensitized tissue from which it is transferred to the surface of the printing cylinder and subsequently etched into the cylinder surface.

Register marks are drawn on the tissue sheet in the margin spaces at the centers of the top, bottom and both sides of the page. These marks if projected across the sheet would form a vertical line and a horizontal line crossing each other at the center of the page. However, the register marks are placed only in the margin spaces where they will not show in the printing. With the marking machine shown herein, suitable marks may be placed on the surface of the cylinder so that when the register marks on the tissue sheets are aligned with the marks on the cylinder the tissue sheets will be correctly positioned to insure that the images transferred and etched therefrom will produce accurately registered printing.

When printing a product such as a newspaper supplement, the printing cylinders are usually arranged to print eight pages at each revolution, the circumference of the cylinder being the length of two pages, and the length of the cylinder providing for the printing of four pages abreast. Provision for marking cylinders to conform with this arrangement is described herein, but it is of course evident that other arrangements may be used.

In operation, the hinged bearing section 19 being raised, the printing cylinder which usually has a copper surface that is accurately ground to the correct diameter, is placed with the shaft resting on the skids 24. The cylinder is then rolled into the bearing blocks 14, 15 and the hinged sections 19 closed and secured by the screws 23. The handwheel 29 is then placed on the shaft and secured by the key 31.

The hand screw 26 is next tightened to bring the shoulder 28 against the end of the bearing 15 and locked in position by tightening the locking wheel 27.

By drawing the spindle 63 farther back and turning the knob 67, the collar 68 will

rest on the end of the pin 69, and hold the marker away from the cylinder. The carriage may now be moved to one of the positions for marking the cylinder circumferentially. Four such marks are usually made 5 locating the vertical center lines of the pages, and they would pass through the points 73 on the cylinder, if however, double page forms are used, the lines would be drawn 10 through the points 74 instead. Holes 52 in the carriage way are provided for each marking position and are so located that when the plunger 53 enters them the marker is properly positioned to indicate the center of a form widthwise.

To mark the cylinder, the knob 67 is turned to align the slot in the collar 68 with the pin 69, and the spring 65 then presses the marker against the cylinder 18. The handwheel 29 is then turned and the marker draws a line 20 circumferentially of the cylinder. This operation is then repeated for each form.

The handwheel is then turned until one of the holes in its rim, as hole 32, is aligned 25 with the pin 36. The pin is then pushed into the hole and serves to hold the cylinder from turning. The plunger 52 is then withdrawn from the locking position and the carriage 40 is slid along the carriage way. The marker 30 being in contact with the cylinder, a line is drawn across it lengthwise, forming a register mark for horizontal lines through the centers of four of the forms.

The handwheel is then released, turned 35 through a half revolution, again locked by placing the pin 36 in hole 34, and a second line drawn lengthwise of the cylinder providing horizontal register marks for the other four forms.

In case the cylinder is being prepared for 40 printing tabloid papers, the pages of which are one half the size of those referred to in the above description, the holes 33 and 35 in the handwheel would also be used and two 45 additional lines drawn lengthwise of the cylinder. The cylinder thus carries four pages circumferentially and four pages lengthwise, and prints sixteen pages at each revolution.

In multi-color work the cylinder carrying 50 the yellow color usually makes the first impression on the web which then passes on to the red, blue and black printing cylinders in succession. After each printing operation the web is treated, usually by heating, to dry 55 the ink and this operation causes an appreciable shrinkage of the web both longitudinally and widthwise.

The shrinkage in length is compensated for by making the cylinders progressively smaller 60 in circumference so that the difference in this respect between each cylinder and the following one will equal the shrinkage of the web at that point.

Compensation for the widthwise shrinkage 65 is made by placing the forms on each

succeeding cylinder closer together lengthwise of the cylinder than those on the preceding cylinder. Thus the forms for the second cylinder are located with slightly less separation between the pages than between those 70 on the first cylinder, and progressively less separation is allowed on the third and fourth cylinders.

The adjustable marker slide provides a convenient means for placing the marks on 75 the cylinder at progressively smaller distances from the center in order to compensate for web shrinkage.

In practice, all the circumferential lines on the first printing cylinder are marked with 80 the marker slide 45 set in the mid position.

When marking the second cylinder, for the first page from the left hand end of the cylinder, the marker slide is moved to the right a predetermined distance which is indicated 85 by a mark on the index plate 50'. For the second page, the marker slide is moved to another indicated position which is midway between the mark for the first page and the mid position. The position of the third page 90 is marked with the marker slide moved to the left of the mid position, a distance equal to that used for the second page and the mark for the fourth page, which is on the right hand end of the cylinder is made with 95 the marker head moved to the left a distance equal to that used in the case of the first page.

The other cylinders are similarly marked but the marker slide is offset to a greater extent for the third cylinder, and to a still 100 greater extent for the fourth cylinder, the various positions all being indicated and properly identified by marks on the index plate.

It will be seen that with the machine described herein, means are provided for accurately marking the printing cylinders used in photogravure printing and that in multi-color work the several cylinders which print the different colors, can have their surfaces 110 properly marked to allow for shrinkage of the web, and with such precision that the forms can be placed thereon in position to produce very accurate register in the printing. 115

What I claim is:

1. In a device for marking a cylinder used in a rotary photogravure printing machine, a frame having aligned bearings for the cylinder and a carriage way parallel with the 120 axis of the bearings, means for quickly positioning and holding the cylinder in a plurality of positions which embrace predetermined arcs or its rotation, a carriage slidable along the carriage way, and a marker operably 125 supported by the carriage and adapted to mark the periphery of the cylinder lengthwise when the carriage is moved along the carriage way.

2. In a device for marking a cylinder used 130

in a rotary photogravure printing machine, a frame having aligned bearings for the cylinder and a carriage way parallel with the axis of the bearings, a carriage slidable on the carriage way, means for quickly locating the said carriage and holding it in predeterminedly spaced positions on the carriage way, a marker operably supported by the carriage and adapted to make a straight mark lengthwise on the periphery of the cylinder when the cylinder is stationary and the carriage is moved along the carriage way, and a mark circumferentially of the cylinder when the carriage is held in one of said positions and the cylinder is rotated in its bearings.

3. In a device for marking a cylinder used in a rotary photogravure printing machine, a frame having aligned bearings for the cylinder and a carriage way parallel with the axis of the bearings, a marker, a support for the marker including a carriage slidable on the carriage way, a marker slide on the carriage and adjustable with respect thereto longitudinally of the carriage way, and means for holding the marker in the marker slide.

4. In a device for marking a cylinder used in a rotary photogravure printing machine, a frame having aligned bearings for the cylinder and a carriage way parallel with the axis of the bearings, a marker, a support for the marker including a carriage slidable on the carriage way, a marker slide for the carriage adjustable longitudinally of the carriage way, and means for holding the marker in the marker slide, said marker holding means being spring actuated to press the marker against the periphery of the cylinder to mark it.

5. In a device for marking a cylinder used in a rotary photogravure printing machine, a frame having aligned bearings for the cylinder and a carriage way parallel with the axis of the bearings, a marker, a support for the marker including a carriage slidable on the carriage way, a marker slide for the carriage adjustable longitudinally of the carriage way and means for holding the marker in the marker slide; said marker holding means being spring actuated and arranged to normally press the marker against the periphery of the cylinder to mark it and having means to hold the marker out of contact with the cylinder.

6. In a device for marking a cylinder used in a rotary photogravure printing machine, a frame having aligned bearings for the cylinder, a carriage way parallel with the axis of the bearings, a carriage slidable on the carriage way, a marker slide on the carriage and adjustable longitudinally of the carriage way, a marker, and a spindle for holding the marker; said spindle being arranged to slide in the marker slide on a line radial to the said axis and being biased toward the axis.

7. In a device for marking a cylinder used in a rotary photogravure printing machine, a frame having aligned bearings for the cylinder, a carriage way parallel with the axis of the bearings, a carriage slidable on the carriage way having means for quickly locating and holding it in predeterminedly spaced positions thereon, and a marker slide on the carriage adjustable longitudinally of the carriage way, having a device to indicate the position of the marker slide with reference to the carriage and means to operably hold a marker.

8. In a device for marking cylinders used in multicolor rotary photogravure web printing, wherein the web shrinks between the impressions, a support having aligned bearings adapted to support a cylinder and having a carriage way parallel with the axis of the cylinder, a carriage locatable at predetermined positions on the carriage way, a marker, a marker slide supporting the marker and adjustable in relation to the carriage, longitudinally of the carriage way, and means to indicate adjustments of the marker with respect to the carriage, that will enable an operator to so mark a plurality of cylinders as to compensate for web shrinkage between impressions.

9. In a device for marking a cylinder used in a rotary photogravure printing machine, a frame having aligned bearings for the cylinder, a carriage way parallel with the axis of the bearings, a carriage slidable on the carriage way, a marker support associated with the carriage and having a spindle, means to operably hold a marker in the spindle to press the marker into contact with the surface of the cylinder, and other means whereby the marker may be held out of contact with the cylinder.

10. In a device for marking cylinders used in multi-color rotary photogravure web printing, wherein the web shrinks between impressions, a frame having aligned bearings adapted to support a cylinder and a carriage way parallel with the axis of the bearings, a carriage locatable at predetermined positions on the carriage way, a marker adapted to draw register marks lengthwise and circumferentially on the periphery of a cylinder, a marker slide supporting the marker and adjustable in relation to the carriage longitudinally of the carriage way, means to indicate adjustments of the marker slide with respect to the carriage, to permit accurately adjusting the marker to compensate for shrinkage of the web between impressions, and means for positioning and holding a cylinder in a plurality of positions which embrace predetermined arcs of its rotation.

In testimony whereof, I affix my signature.

JOHN F. SPRINGSTEAD. 130