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APPARATUS FOR MAKING PRINTING ROLLS

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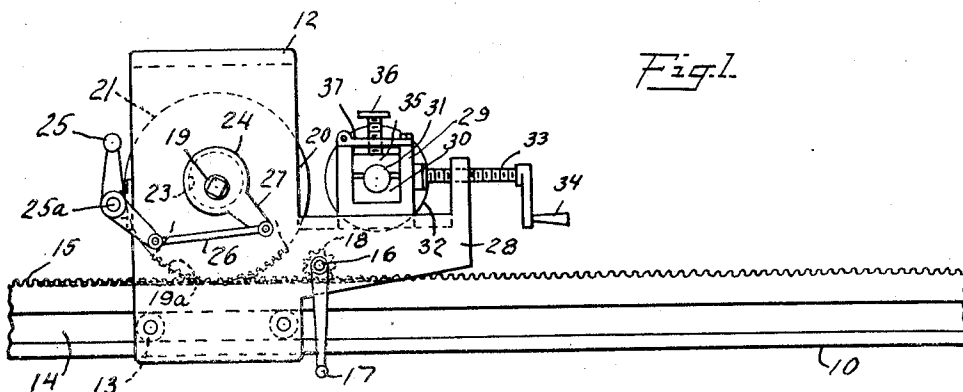


Fig. 1.

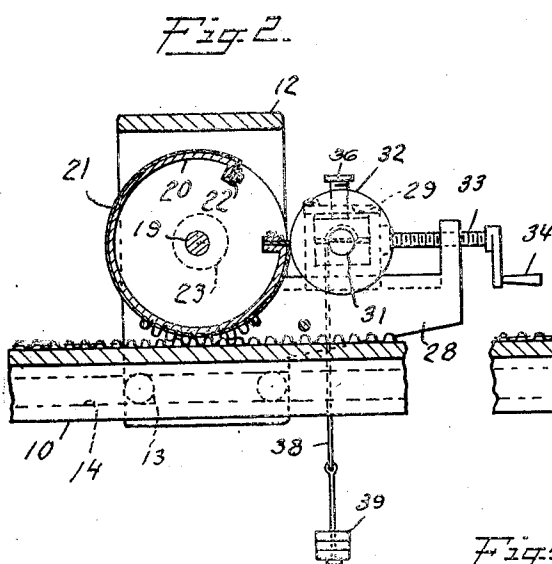


Fig. 2.

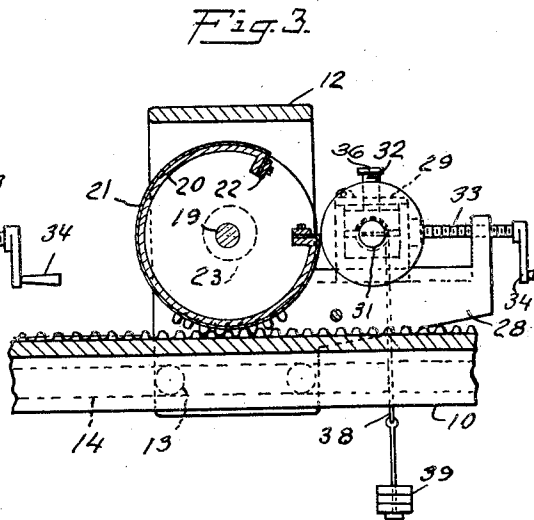


Fig. 3.

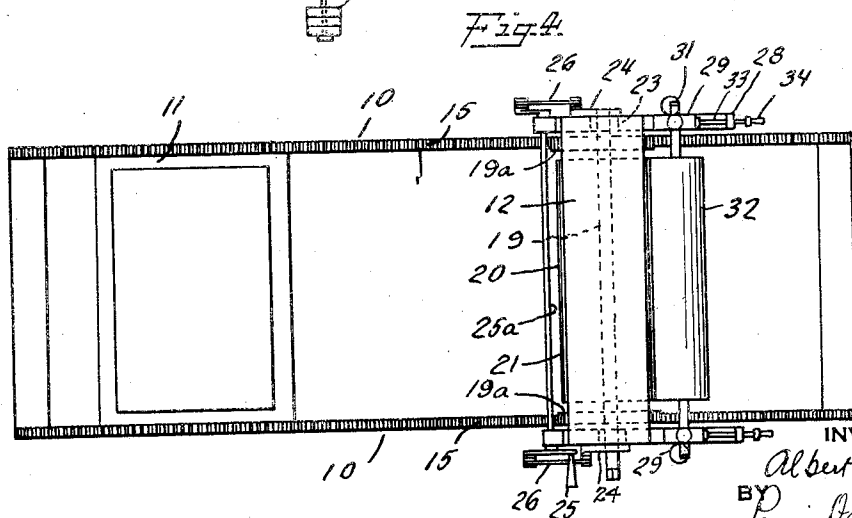


Fig. 4.

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APPARATUS FOR MAKING PRINTING ROLLS

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This invention relates to the art of producing rolls for the continuous printing of fabrics, paper, and the like, and is concerned more particularly with a machine for transferring a design to the surface of a printing roll preliminary to the etching of the roll.

In the production of printing rolls, a procedure frequently followed involves the steps of preparing a flat zinc plate carrying repetitions of the design, and transferring the design from the plate to the surface of a blanket, and then from the blanket to the surface of the roll. The zinc plate is produced by photographic methods, and according to one method, a negative is made of the complete design and this negative is photographed on the sensitized surface of the zinc plate the desired number of times in photographic apparatus, such as a step-and-repeat machine. In making the negative, the design is reduced or enlarged to the end that the total area of the reproductions on the zinc plate may correspond as closely as possible to the surface area of the printing roll, but even with the best methods, it is frequently found that the ends of the pattern do not match exactly on the roll. That makes the roll useless for printing purposes, since any gap or overlap of the pattern on the roll results in defects in the material being printed.

Machines of various types have been devised for transferring the design from the zinc plate to the roll and in those machines provision has been made for effecting an exact matching of the ends of the pattern on the roll by causing the roll to slip relative to the blanket during the transfer operation. In one machine, it has been proposed, for example, to transfer the design to the roll by placing the roll in contact with the blanket and rotating the roll by its frictional contact with the blanket which is positively driven; in addition to the friction drive for the roll, a positive drive for the roll is provided for the purpose of retarding or accelerating the roll to the extent necessary to produce the slippage required. The expedients suggested, while providing for a delicate adjustment are somewhat complicated in construction.

It is accordingly the object of this inven-

tion to provide a transfer machine of the type above generally described in which the exact matching of the ends of the pattern transferred to the copper roll is effected by a simple and inexpensive mechanism which is easy to operate and does not get out of order. In the machine, I provide a support for the zinc plate, a cylinder with its blanket mounted in a carriage which is movable over the support, and bearings on the carriage for the journals of the copper roll. I also provide gravity operative means effective to accelerate or retard the copper roll during the time that it is rotating in contact with the blanket. One convenient form of the accelerating and retarding means may be straps and weights which may be connected to the shaft of the copper roll so as to assist or oppose rotation of that roll produced by its contact with the blanket. In addition to the straps and weights, the machine may be provided with a suitable brake mechanism which may be used in substitution for or in combination with the straps and weights for retarding purposes, the brake mechanism being preferable to the straps and weights because of greater ease of control of the retarding action.

For a better understanding of the invention, reference may be had to the accompanying drawing in which

Fig. 1 is a view of the main features of the machine in side elevation with the parts in the positions which they assume in the operation of transferring the design from the plate to the blanket;

Figs. 2 and 3 are views in vertical longitudinal section of the features illustrated in Fig. 1, showing the retarding and accelerating mechanism, respectively, and

Fig. 4 is a plan view of the mechanism illustrated in Fig. 1.

Referring now to the drawing, the machine is illustrated as including a pair of longitudinal members 10 which may be supported on any suitable legs or base. Between these members and near one end thereof is a bed plate 11 on which may be disposed the flat zinc plate carrying the reproductions of the design. A carriage 12 comprising side members and a top piece is mounted on the

longitudinal members 10 and is movable lengthwise of the machine on rollers 13 running in guideways 14 formed, for example, in the sides of the members 10.

5 Racks 15 are provided along the tops of the members 10, these racks extending substantially throughout the length of the members 10 and having relatively deep teeth. A shaft 16 operable by a handle 17 extends

10 across the carriage and carries pinions 18 meshing with the racks, so that rotation of the shaft 16 causes the carriage to move along the members 10.

Mounted in the carriage is a shaft 19 for

15 the blanket cylinder 20, this cylinder carrying a rubber blanket 21, the ends of which enter an opening in the cylinder and are secured by clamping devices 22 by which the blanket can be held taut. The shaft 19 is

20 supported eccentrically in bearings 23 mounted in supports 24, the supports being rotatable by means of a handle 25 on a shaft 25^a mounted on the carriage and connected by linkage 26 to crank arms 27 projecting from

25 the supports. By operation of the shaft 25^a, the shaft 19 may be raised and lowered to bring the blanket surface into and out of contact with the zinc plate. Gears 19^a on shaft

30 19 mesh with the racks 15 to cause cylinder 20 to rotate when the carriage is moved along, and the construction of the teeth of the gears is such that the cylinder may be raised slightly

35 above the plane of the zinc plate on support 11 and still be rotated by the gears and racks as the carriage moves. Also, the shaft 19 may have a squared end to which a handle may be applied in the usual way for rotation of the cylinder without moving the carriage.

40 The carriage is provided at one end with extensions 28 on which are mounted sliding blocks 29 carrying bearings 30 for the shaft 31 of a copper roll 32, the blocks being engaged by screws 33 having cranks 34 which

45 may be operated to move the blocks and roll toward and away from the blanket cylinder. In each block 29 above the shaft 31 is a brake shoe 35 operated upon by a screw 36, the screw being mounted in a plate 37 hinged to

50 the top of the block 29 and covering the opening formed in the block for the reception of bearing 30, shaft 31, and brake shoe 35. This hinged construction permits the plate 37 to be swung away from the block

55 29 so that the brake shoe 35 may be removed and the roll lifted free and another one inserted in position.

In the operation of the parts so far described, the zinc plate is placed on the bed

60 plate 11 and prepared for the transfer operation in the usual way. The carriage is then moved to a point near the end of the plate, and the blanket cylinder lowered into contact with the plate. The carriage is then

65 moved over the plate and in this operation,

the blanket cylinder rolls over the plate and the design is transferred from the plate to the blanket. During these operations, the copper roll is backed away from the blanket surface as illustrated in Fig. 1. The carriage is now moved away from the zinc plate, the blanket cylinder moved to its raised position if desired, and the copper roll forced into contact with the blanket surface at the desired pressure. The blanket cylinder may now be rotated by appropriate means such as the handle, if the cylinder is in fully raised position, or if the cylinder is only partially raised and in a position in which gears 19^a still remain in mesh with the racks, the rotation of the cylinder may be accomplished by movement of the carriage along the support. In either case, the blanket cylinder is rotated so as to transfer the design to the roll during a single rotation of the latter.

If the design picked up by the blanket has exactly the same length as the circumference of the roll, the pattern will be applied to the roll with its ends exactly meeting. However, it is usually found that there is a slight difference in the length of the design on the blanket and the circumference of the roll, and this difference can be corrected to produce an exact matching of the ends of the pattern on the roll by causing the roll to slip slightly with reference to the blanket and thus have either a greater or less peripheral speed than the blanket.

In my machine, the slippage of the roll relative to the blanket may be accomplished by securing to the shaft 31 of the roll at each end a strap 38 which carries at its lower end one or more weights 39. These straps may hang down from the shaft on either side of the axis thereof. With the parts in the position illustrated in Fig. 2, the blanket cylinder 20 will be rotated in a counter-clockwise direction to effect the transfer of the copper roll, and the roll itself will move clockwise during the transfer operation. With the strap applied to the shaft of the roll as illustrated, the weights are raised as the roll rotates and the weights thus oppose the rotation of the roll and cause retardation and slippage. The amount of this slippage is determined by the number and size of the weights on the end of the straps and, by proper selection of the weights, it is possible to effect the slippage required to produce the exact matching of the pattern ends on the roll. When the design on the blanket is slightly longer than the circumference of the roll, the straps and weights are used in the manner illustrated in Fig. 2 and since the slippage of the roll with reference to the blanket is distributed throughout the length of the pattern, no distortion is visible where the difference in length of the pattern and the circumference of the roll is relatively small.

In the construction illustrated in Fig. 3, the straps and weights have been applied to accelerate the roll when the latter is rotated in a clockwise direction and this arrangement of the straps and weights is employed where the length of the design is slightly less than the circumference of the roll.

When the straps and weights are employed in the manner above described for accelerating or retarding the roll, the brake shoes rest lightly on the shaft of the roll and are without effect. This brake mechanism affords a means for retarding the copper roll which is somewhat more convenient to operate than the straps and weights. In general, better results are obtained when the correction is made by retarding the copper roll relative to the blanket and the desired retardation may be obtained by using either the straps and weights in the manner illustrated in Fig. 2 or the brake mechanism shown in Fig. 1 or both in combination. When the brakes are employed, the braking effect is controlled by varying the pressure with which the brake shoes bear against the copper roll.

It will be seen that in my machine, the mechanism for producing a slippage of the copper roll relative to the blanket in order to cause the ends of the pattern transferred to the copper roll to be exactly matched is simple in construction and easily operated. This mechanism, whether in the form of the straps and weights or of the brakes, can be regulated to effect a greater or less slippage as may be desired and has proven unusually effective for the purpose for which it is intended. Since the brakes offer a more convenient and satisfactory means for producing the slip and serve only to retard the roll and thus correct for an excess of the design, I prefer that the zinc plates carry a design which is slightly longer than the circumference of the roll. This slight excess can be easily obtained during the photographic process incident to the preparation of the plate.

What I claim is:

1. A machine for producing printing rolls, which comprises a support for a flat member carrying a design, a curved member carrying a blanket, a carriage movable over the flat member, means on the carriage for supporting the curved member and operable to move said member into contact with the flat member, supports on the carriage for the journals of a printing roll, said supports being adjustable toward and away from the curved member to move the printing roll into and out of contact with the curved member, means for rotating the curved member and printing roll while they are in contact, and gravity operative means for varying the peripheral velocity of the printing roll relative to that of the curved member while the two are in contact.

2. A machine for producing printing rolls, which comprises a support for a flat member carrying a design, a curved member carrying a blanket, a carriage movable over the flat member, means on the carriage for supporting the curved member and operable to move said member into contact with the flat member, supports on the carriage for the journals of a printing roll, said supports being adjustable toward and away from the curved member to move the printing roll into and out of contact with the curved member, means for rotating the curved member and printing roll while they are in contact, and gravity-actuated means and brake means operable on a part rotating with the printing roll for accelerating and retarding it with reference to the curved member when the two are rotating in contact, said means being employed as alternates.

3. A machine for producing printing rolls, which comprises a support for a flat member carrying a design, a curved member carrying a blanket, a carriage movable over the flat member, means on the carriage for supporting the curved member and operable to move said member into contact with the flat member, supports on the carriage for the journals of a printing roll, said supports being adjustable toward and away from the curved member to move the printing roll into and out of contact with the curved member, means for rotating the curved member and printing roll while they are in contact, and a weight attachable to a part rotating with the printing roll and effective to vary the peripheral velocity of the roll relative to that of the curved member, while the two are in contact.

4. A machine for producing printing rolls, which comprises a support for a flat member carrying a design, a curved member carrying a blanket, a carriage movable over the flat member, means on the carriage for supporting the curved member and operable to move said member into contact with the flat member, supports on the carriage for the journals of a printing roll, said supports being adjustable toward and away from the curved member to move the printing roll into and out of contact with the curved member, means for rotating the curved member and printing roll while they are in contact, a strap attachable to a part rotating with the printing roll, and a weight secured to the strap, said strap and weight being operable in two positions of dependence from said journal alternately to accelerate or retard said printing roll relative to said curved member when the two rotate in contact.

5. A machine for producing printing rolls, which comprises a support for a flat member carrying a design, a curved member carrying a blanket, a carriage movable over the flat member, means on the carriage for supporting the curved member and operable to

move said member into contact with the flat member, supports on the carriage for the journals of a printing roll, said supports being adjustable toward and away from the curved member to move the printing roll into and out of contact with the curved member, means for rotating the curved member and printing roll while they are in contact, and a brake operable on a part rotating with said printing roll and effective to retard the printing roll relative to the curved member while the two rotate in contact.

6. A machine for producing printing rolls, which comprises a support for a flat member carrying a design, a curved member carrying a blanket, a carriage movable over the flat member, means on the carriage for supporting the curved member and operable to move said member into contact with the flat member, supports on the carriage for the journals of a printing roll, said supports being adjustable toward and away from the curved member to move the printing roll into and out of contact with the curved member, means for rotating the curved member and printing roll while they are in contact, a weight attachable to a part rotatable with the printing roll and operable to accelerate said roll relative to said curved member while the two rotate in contact, and a brake operable on a part rotatable with said printing roll to retard said roll relative to said curved member, said brake and weight being employed as alternatives.

7. In a machine for producing printing rolls, the combination of a blanket mounted to provide a curved surface, a printing roll movable into engagement with said blanket, means for rotating the blanket and roll in contact, and gravity operative means for varying the relative peripheral velocities of the blanket and printing roll while they rotate in contact.

8. In a machine for producing printing rolls, the combination of a blanket mounted to provide a curved surface, a printing roll movable into engagement with said blanket, means for rotating the blanket and roll in contact, and a strap carrying a weight and attachable to a part rotating with the printing roll, said strap having two positions of attachment and being operable in one position to increase, and in the other to decrease, the peripheral velocity of the printing roll relative to that of the blanket while the two rotate in contact.

9. In a machine for producing printing rolls, the combination of a blanket mounted to provide a curved surface, a printing roll movable into engagement with said blanket, means for rotating the blanket and roll in contact, a strap carrying a weight and attachable to a part of the printing roll, said strap and weight being effective to increase the peripheral velocity of the printing roll rela-

tive to that of the blanket while the two rotate in contact, and a brake operable on a part of the printing roll and effective to decrease the peripheral velocity of the printing roll relative to that of the blanket while the two rotate in contact, said brake and strap being operable as alternatives.

In testimony whereof I affix my signature.

ALBERT C. GIRDWOYN.