

June 18, 1963

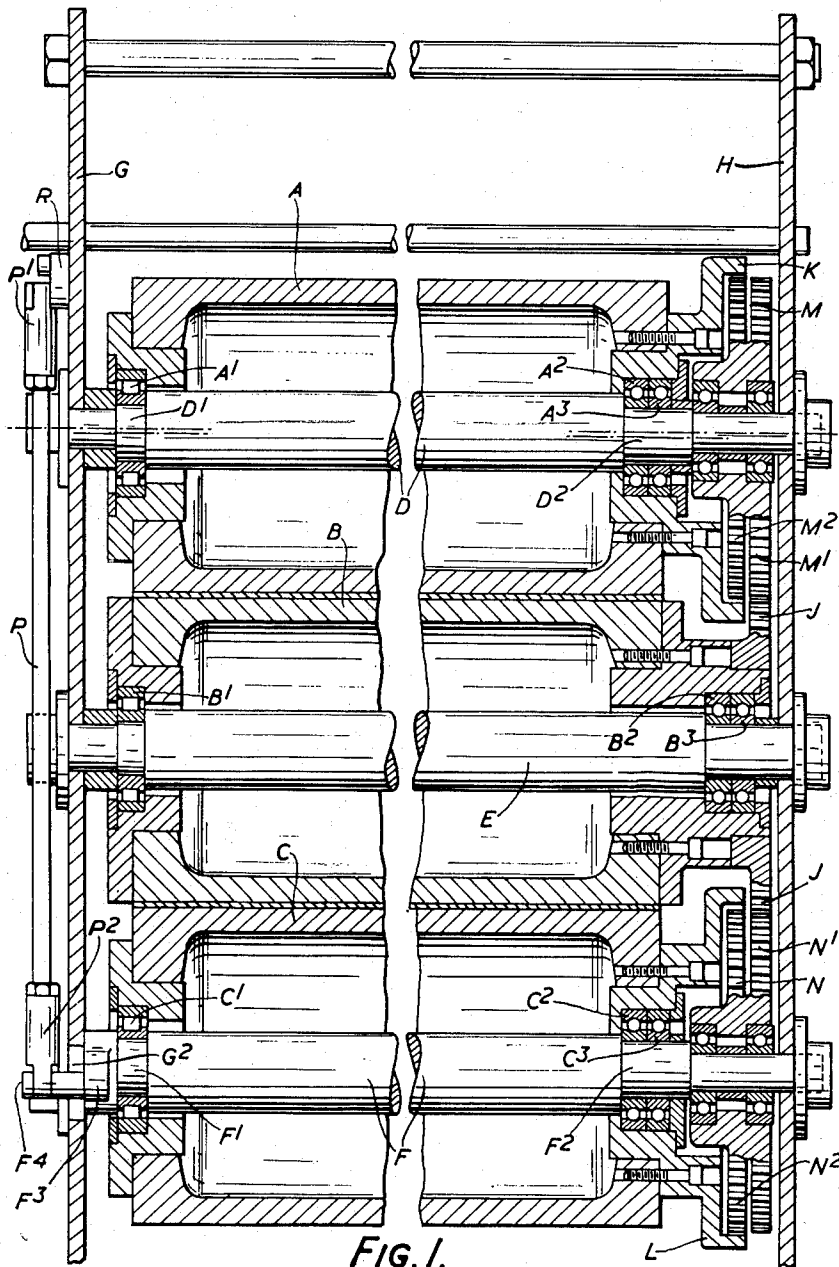
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CYLINDERS FOR PRINTING MACHINES

Filed Feb. 19, 1962

2 Sheets-Sheet 1



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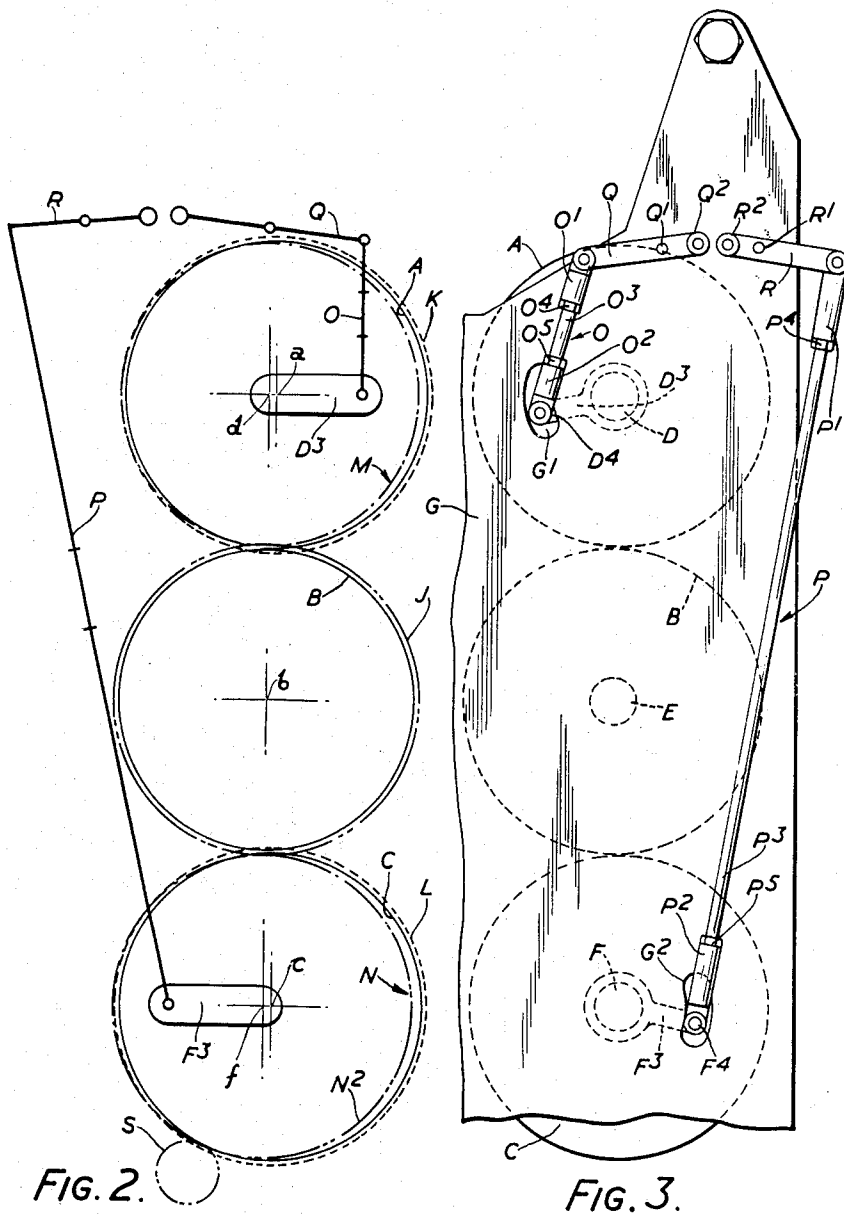
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CYLINDERS FOR PRINTING MACHINES

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Filed Feb. 19, 1962, Ser. No. 174,050

Claims priority, application Great Britain Feb. 22, 1961

4 Claims. (Cl. 101-218)

This invention relates to a driving and adjusting mechanism and more particularly to a driving and adjusting mechanism for a roller mechanism where it is necessary to move the axis of a roller towards or away from the axis of another roller or a plate, table or similar surface.

Although in many mechanisms it is necessary to provide means for moving the axis of a roller towards and away from another axis, the present invention is particularly useful in planographic or offset printing machines. In such machines the plate cylinder, the transfer cylinder and the impression cylinder must be separable one from the other, when the machine is stopped and the plate cylinder and impression cylinder must be separately adjustable relative to the transfer cylinder for inking up and for taking into account different paper thicknesses.

In accordance with this invention, a driving and adjusting means for a roller mechanism is provided whereby the relative movement of the axes of the rollers does not affect the depth of mesh of the gears which drive the rollers. This invention, as embodied herein, includes a driven roller, the axis of which is movable towards and away from a co-operating surface and further includes a driving gear mounted to rotate on a fixed axis about which the axis of the roller is movable and an internal gear which rotates with the roller and meshes with the driving gear.

In accordance with this invention, two rollers can be provided wherein one roller drives another roller and wherein the distance between the axes of the rollers is adjustable. As embodied in this form of the invention, an external gear ring is provided which rotates with one roller, and internal gear is provided which rotates with the other roller. An intermediate gear element is mounted to rotate on a fixed axis and the axis of the second roller is offset with respect to and adjustable around the fixed axis. The intermediate gear element meshes with both the internal and external gear rings and the ratio between the external gear ring and the intermediate gear element is the same as the ratio between the internal gear ring and the intermediate gear element.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements shown and described.

With the foregoing in mind it is an object of this invention to provide an improved adjusting and driving means for a roller mechanism.

Another object of this invention is to provide an improved adjusting and driving means for a roller mechanism wherein the depth of mesh of the driving gears will remain constant.

Another object of this invention is to provide an improved adjusting and driving means for a roller mechanism wherein the depth of mesh of the driving gears will remain constant when there is relative movement of the axes of the roller mechanism.

A further object of this invention is to provide an improved adjusting and driving means for a roller mechanism including means for moving the axis of a roller towards or away from another axis without changing the depth of mesh of the driving gears for the roller mechanism.

A further object of this invention is to provide a new

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and improved mechanism for a planographic or offset printing machine.

Still another object of this invention is to provide a new and improved planographic printing machine including a plate cylinder, a transfer cylinder and an impression cylinder wherein the distance between the plate cylinder and the impression cylinder with respect to the transfer cylinder can be varied without changing the depth of mesh of the gears driving the cylinders.

A still further object of this invention is to provide a roller mechanism having at least two rollers adjustable in distance either simultaneously or individually from a fixed axis without changing the depth of mesh of the driving gears for the rollers.

Additional objects and advantages of the invention will be set forth in the description which follows and in part will be obvious from the description, or may be learned from practice of the invention, the objects and advantages being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

Although the invention will be particularly described with detailed reference to a planographic or offset printing machine, it will be understood that the invention herein is applicable to many different forms of roller mechanisms.

Briefly described, the present invention includes a plate cylinder and an impression cylinder mounted eccentrically on shafts which are movable about axes fixed in relation to the axis of a transfer roller. The transfer cylinder is provided with an external gear ring which meshes with intermediate gear elements each rotatable about the fixed axis of one of the shafts. The intermediate gear element also meshes with an internal gear ring rotating with the plate cylinder and the impression cylinder, respectively. The gear ratio between the external gear ring and each intermediate gear element is the same as the gear ratio between each intermediate gear element and the internal gear with which it meshes.

The accompanying drawings which are incorporated in and constitute a part of this specification, illustrate an embodiment of the invention, and together with the description, serve to explain the principles of the invention.

Of the drawings:

FIGURE 1 is a sectional elevation showing the plate cylinder, the transfer cylinder and the impression cylinder of a planographic or offset printing machine embodying the invention.

FIGURE 2 is a diagrammatic end view, looking from the right of FIGURE 1, of the arrangement shown in FIGURE 1, showing the gearing connecting the cylinders; and

FIGURE 3 is an end view, looking from the left in FIGURE 1.

Reference will now be made in detail to the present preferred embodiment of the invention, and an example of which is illustrated in the accompanying drawings.

Referring to the drawings, a plate cylinder A, transfer cylinder B, and impression cylinder C are mounted in parallel relation to one another on shafts D, E and F respectively, these shafts being supported at their ends in side plates G and H of the machine. The transfer cylinder B is mounted concentrically on the shaft E by means of a roller bearing B¹ and a pair of ball bearings B², B³ arranged to take end thrust in opposite directions.

In accordance with this invention, means are provided for eccentrically mounting the plate cylinder and the impression cylinder. As embodied herein, the plate cylinder A is mounted on eccentric portions D¹ and D² of the shaft D by roller and ball bearings A¹, A² and A³

so that the axis of cylinder or roller A is eccentric to the axis of shaft D. Similarly, the impression cylinder C is mounted on eccentric portions F¹ and F² of shaft F by roller and ball bearings C¹, C² and C³ so that the axis of cylinder or roller C is eccentric to the axis of shaft F.

It will be understood by those skilled in the art that, since the shafts D and F are rotatably mounted in the side plates G and H, when rotation thereof is caused by the instrumentalities subsequently described, the cylinders A and C will be caused to move towards or away from cylinder B.

In accordance with the invention, gear means are provided for driving the roller mechanism wherein the depth of mesh of the gear means remains constant when the axes of the rollers change position. This means, as embodied herein, includes an external gear ring J which is fixed to the transfer cylinder B and internal gear rings K and L having the same number of teeth as external gear ring J which are fixed to the plate cylinder A and the impression cylinder C, respectively. On a concentric portion of each of the shafts D and F there are mounted intermediate gear elements M and N, respectively. The gear element M has two sets of teeth M¹ and M² having the same number of teeth which mesh with the gear rings J and K, respectively. The gear element N has two similar sets of teeth N¹ and N² which engage gear rings J and L, respectively.

In view of the foregoing, it will be apparent that, since the gear elements M and N rotate about axes which are fixed with relation to the axis of the shaft E, the teeth M¹ and N¹ will have a constant depth of mesh with the teeth of the external gear ring J. In addition, when the axes of the cylinders A and C move the spacing of the cylinders is altered, through arcs about the centers of the gear elements and the teeth M² and N² will have a constant depth of mesh with the teeth of the internal gear rings K and L, respectively. Consequently, no change in the depth of mesh of the gears is caused by relative movement and adjustment of the distance between cylinders, and no backlash or uneven wear is caused by such relative movement. The cylinders may be driven in any suitable manner, for example, by an electric motor (not shown) driving a pinion S (FIGURE 2) meshing with the teeth N¹ of the gear element N.

The relative positions of the cylinders are shown in FIGURE 2 where only the centers and pitch circles of the gear rings and gear elements are shown, the several pitch circles being indicated by the reference letters by which the gear rings and gear elements are identified in FIGURE 1. The cylinders are shown in FIGURE 2 in their positions of closest proximity, the centers of the three cylinders A, B and C being indicated at a, b and c respectively, and the centers of the shafts D and F at d and f respectively. It will be seen that the cylinder A is moved away from the cylinder B by anti-clockwise rotation of the shaft D, and that the cylinder C is moved away from the cylinder B by clockwise rotation of the shaft F.

In accordance with this invention means are provided for moving the plate cylinder and the impression cylinder towards or away from the transfer cylinder. As embodied herein this means includes radial arms D³ and F³ which are secured to the ends of shafts D and F opposite to the gear rings K and L (FIGURES 1, 2 and 3). The arms D³ and F³ are mounted inside the side plate G and carry at their outer ends pins D⁴ and F⁴ which project through arcuate slots G¹ and G² in the side plate G. Pivottally connected to the pins D⁴ and F⁴ respectively are rods O and P which are pivottally connected at their other ends to levers Q and R respectively which are pivoted at Q¹ and R¹ on the side plate G. The levers Q and R carry cam followers Q² and R² which co-operate with a suitable cam (not shown) in such a way that movement of the cam effects the separation or approach of both

the plate cylinder A and the impression cylinder C from or to the transfer cylinder B.

In accordance with this invention, means are provided for independently adjusting the position of plate cylinder and impression cylinder with respect to the transfer cylinder. As embodied herein, each of the rods O and P include end members O¹ and O² and P¹ and P² and central portions O³ and P³ respectively. The central portions O³ and P³ have right and left hand screw threads engaging corresponding screw threads in the end members. In order to prevent undesired movement of the parts lock nuts O⁴ and O⁵ and P⁴ and P⁵ are provided. It will be understood that by suitable movement of the above-mentioned parts, the position of the cylinders A and C can be adjusted independently.

Thus, the cylinders A and C may be moved simultaneously for throw-off purposes when a run or work is completed, or when the machine is tripped automatically due to interruption of the paper feed, and they may also be moved independently to allow for inking up of the plate cylinder or for adjustment of the pass between the transfer cylinder and the impression cylinder to take account of different thicknesses of the paper used.

It will be understood that the invention in its broader aspects is not limited to the specific details shown and described, but also includes within the scope of the accompanying claims, any departures made from such elements which do not sacrifice their chief advantages.

What is claimed is:

1. A driving and adjusting mechanism comprising: a first shaft, a roller eccentrically mounted on said first shaft and adapted to rotate about an axis offset from the axis of said first shaft, an internal gear fixed to said roller and adapted to rotate therewith, an intermediate gear means rotatably mounted on said first shaft including a gear meshing with said internal gear, a second shaft having an axis spaced from and substantially parallel to the axis of said first shaft, a gear mounted on said second shaft in mesh with said intermediate gear means, and means for rotating said gear on said second shaft the depth of mesh between said gears remaining constant as the distance between the roller axis and the axis for the second shaft changes.

2. A driving and adjusting mechanism comprising: a first shaft, a roller eccentrically mounted on said first shaft and adapted to rotate about an axis offset from the axis of said first shaft, an internal gear fixed to said roller and adapted to rotate therewith, an intermediate gear means mounted on said first shaft including a gear meshing with said internal gear, a second shaft having an axis spaced from and substantially parallel to the axis of said first shaft, a gear mounted on said second shaft in mesh with said intermediate gear means the depth of mesh between said gears remaining constant as the distance between the roller axis and the axis for the second shaft changes, a third shaft, a roller eccentrically mounted on said third shaft and adapted to rotate about an axis offset from the axis of said third shaft, an internal gear fixed to said roller on said third shaft, an intermediate gear means rotatably mounted on said third shaft including a gear meshing with said internal gear, said intermediate gear means on said third shaft meshing with said gear on said second shaft the depth of mesh between said gears remaining constant as the distance between the roller axis and the axis for the second shaft changes.

3. A driving and adjusting mechanism comprising a first shaft, a roller eccentrically mounted on said first shaft and adapted to rotate about an axis offset from the axis of said first shaft, an internal gear fixed to said roller and adapted to rotate therewith, an intermediate gear means mounted on said first shaft including a gear meshing with said internal gear, a second shaft having an axis spaced from and substantially parallel to the axis of said first shaft, a gear mounted on said second shaft

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in mesh with said intermediate gear means, the depth of mesh between said gears remaining constant as the distance between the roller axis and the axis for the second shaft changes, a second roller concentrically mounted on said second shaft, a third shaft, a roller 5 eccentrically mounted on said third shaft and adapted to rotate about an axis offset from the axis of the third shaft, an internal gear fixed to said roller on said third shaft, an intermediate gear means rotatably mounted on said third shaft including a gear meshing with said internal gear, said intermediate gear means in said third shaft meshing with said gear on said second shaft, the 10 depth of mesh between said gears remaining constant as the distance between the roller axis and the axis for the second shaft changes, and means including levers for

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simultaneously changing the distances between the second roller and the first and third rollers.

4. A device, as described in claim 3, wherein said levers include means for permitting the distances between the second roller and the first and third rollers to be changed individually.

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