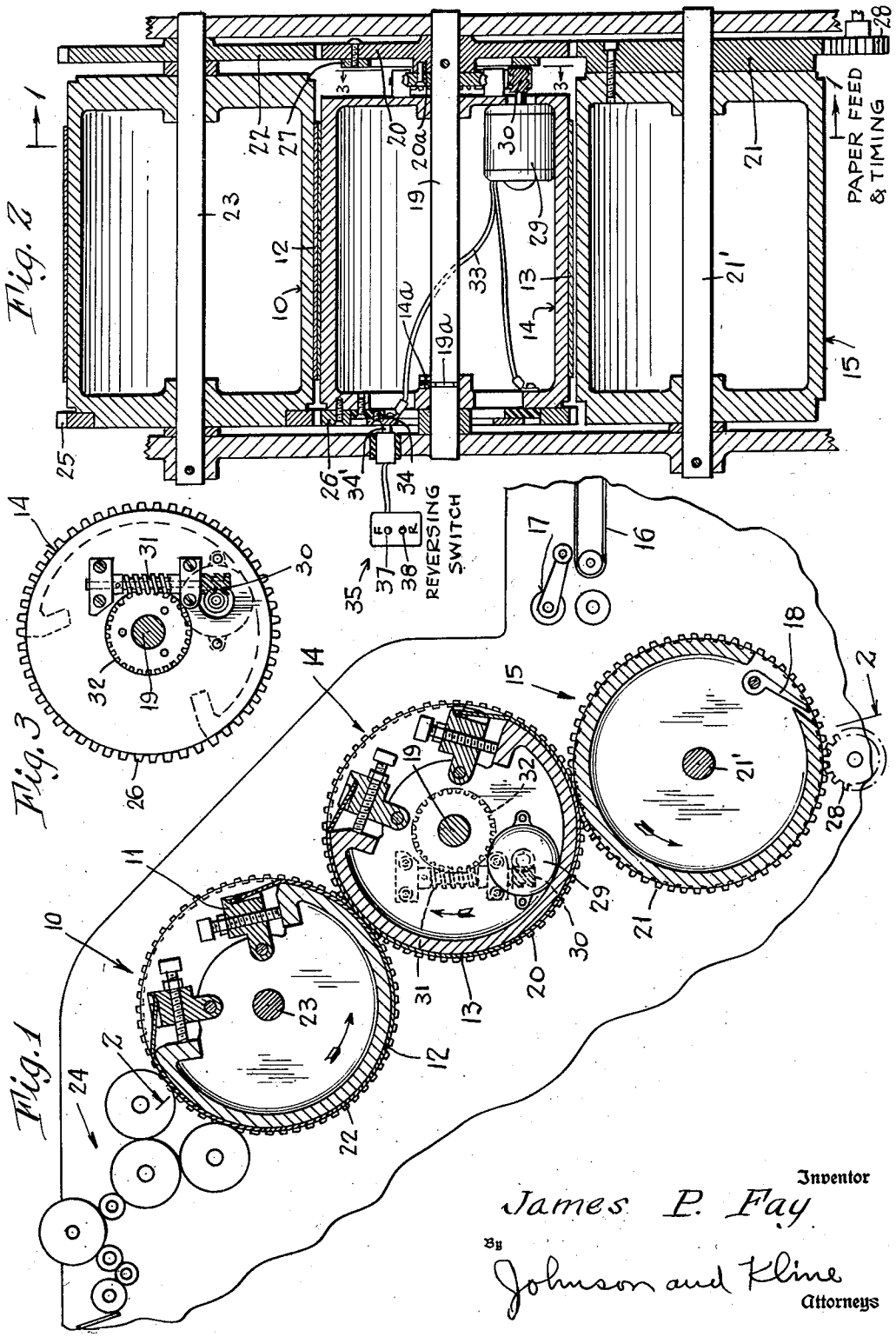
Jan. 2, 1951 J. P. FAY 2,536,679

REGISTERING MECHANISM FOR ROTARY OFFSET PRINTING MACHINES

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REGISTERING MECHANISM FOR ROTARY OFFSET PRINTING MACHINES

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4 Claims. (Cl. 101—248)

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The present invention relates to improved means for obtaining vertical register in an offset printing device.

Heretofore in devices of the type known as "Multilith" duplicators, which are described in Multigraph Model 1250 Reference Book, copyright 1941 by Addressograph-Multigraph Corporation of Cleveland, Ohio, and in which there is a plate cylinder, a blanket cylinder and an impression cylinder driven in predetermined relation and paper feed means driven in timed relation to the impression cylinder, vertical register has been obtained by adjusting the plate cylinder with respect to the driving gear therefor by means of bolts carried in slots in the gear.

The difficulty with this type of adjustment is that it is a cut and try method and each adjustment will change the relative position of the image on the blanket and necessitate cleaning of the blanket before it can be tried to determine whether or not the adjustment has been sufficient to locate the image in vertical register as required. If it is not, the process is repeated until the required register is achieved. This was time-consuming, it usually requiring at least twenty to thirty minutes to make ready for a run under this system.

The present invention overcomes this difficulty by interconnecting the plate and blanket cylinders to rotate in predetermined fixed angular relation and providing an adjustable connection between the blanket cylinder and drive for the impression cylinder whereby the blanket cylinder and its connected plate cylinder are adjusted simultaneously with respect to the impression cylinder to alter the angular relation between the blanket cylinder and impression cylinder and effect vertical register of the printing on the paper on the impression cylinder.

In the preferred form of the invention this is accomplished by providing a reversible electric motor and cooperating gear between the blanket cylinder and drive means so that by rotating the motor in one direction or the other the blanket cylinder may be advanced or withdrawn with respect to the line of printing and effect vertical register.

The motor is so controlled that the adjustment can be accomplished while the machine is operating and, since the blanket and plate cylinder are moved simultaneously, there will be no shifting between the plate and the image on the blanket cylinder, thus eliminating the time-consuming blanket washing operation between each adjustment of the plate with respect to the impression cylinder. The machine according to the present invention can be made ready to run within the time required to print a half-dozen sheets.

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Other features and advantages of the invention will be apparent from the specification and claims when considered in connection with the drawings in which:

Figure 1 shows a vertical section taken along lines 1—1 of Fig. 2.

Fig. 2 is a section taken along lines 2—2 of Fig. 1.

Fig. 3 is an end view of the blanket cylinder and drive therefor taken along line 3—3 of Fig. 2.

The invention will be described in terms of the modifications of the normal Multilith machine to accomplish this purpose; however, it is to be understood that modification in the specific gearing and arrangement of parts may be made to obtain simultaneous adjustment of the plate and blanket cylinders with respect to the impression cylinder when the present invention is applied to original designs of offset printing machines. Only so much of the Multilith machine as is essential to an understanding of the present invention will be discussed.

As shown in Fig. 1, the plate cylinder 10 is provided with suitable means 11 for securing a printing plate 12 about the periphery thereof. The plate engages a blanket 13 clamped to and carried on the periphery of the blanket cylinder 14. The blanket transfers the image from the plate to the paper (not shown) positioned over the surface of the impression cylinder 15. The paper is fed to the impression cylinder by the feed belts 16 and feed roller 17 and clamped in position thereon by clamping means 18.

As shown in Fig. 3, the main drive shaft 19 has a gear 20 pinned thereon which drives the gear 21 secured to the impression cylinder which is mounted to rotate on shaft 21'. Gear 20 also drives gear 22 rotatably mounted on shaft 23 supporting the plate cylinder. Heretofore the gear 20 was secured directly to the blanket cylinder and the gear 22 was adjustably connected to the plate cylinder. In order to carry out the present invention, however, gear 22 which also drives the inking mechanism 24 has been disconnected from the plate cylinder and the plate cylinder has been connected by a gear 25 to a gear 26 secured to the end of the blanket cylinder so that the two cylinders rotate in a predetermined fixed relation.

The paper feed control cam 27 which actuates the roller 17 to inject the paper into the impression cylinder and which is normally carried

by the blanket cylinder has been separated therefrom and is connected to the gear 20. Also, the paper feed and timing mechanism (not shown) for presenting sheets to and actuating the belts 16 is driven from the gear 21 through gear 28. Thus it will be seen that the timing of the paper feed and the control of the insertion of the paper into position on the impression cylinder has not been altered in the present modification of the machine.

The blanket cylinder is mounted on drive shaft 19 for relative rotation. It is held against longitudinal movement thereon by set screw 14a extending into groove 19a on shaft 19. The cylinder is hollow and is connected to the drive means by an adjustable connector of the sun and planet type.

In the form herein illustrated the adjustable connector comprises a motor 29 secured to the inner surface of the blanket cylinder and connected by helical gears 30 to drive a planet gear, worm 31, carried on the end of the cylinder to mesh with a sun gear, wormwheel 32, secured to the face of a hub 20a on the gear 20. The motor is connected by lead 33 to a slip ring 34 which is connected by brush 34' to a suitable source of power (not shown) through a reversing switch 35.

So long as the motor is not energized and does not rotate, the blanket cylinder will be driven directly from gear 20 through the adjustable connector. When it is desired to adjust the connector, however, the motor is driven in either direction as required. The motor for example may be a D. C. motor with a permanent magnet field, and by feeding positive or negative current to the brush 34' by pressing the forward button 37 or reverse button 38, will drive the worm in either direction which acting as a planet gear with respect to the wormwheel 32 causes the relative position of the blanket cylinder to be shifted with respect to gear 20 and the drive to the impression cylinder. This will result in the image being moved up or down with respect to the paper on the impression cylinder and to secure the required vertical register. It will be noted that the adjustment of the blanket cylinder does not in any way alter the drive for the paper feed to the impression cylinder.

Further since the plate cylinder and blanket cylinder are geared together to have a predetermined fixed relation, adjustment of the blanket cylinder simultaneously adjusts the plate cylinder therewith so that there is no shifting of the image on the blanket cylinder and eliminates the necessity of washing of the blanket between each registering adjustment thereof. All that is required of the operator to secure the required register is for him to press the forward button 37 or the reverse button 38, causing the motor to drive the planet gear and shift the blanket cylinder to raise or lower the image on the sheet until accurate registration is achieved which can be accomplished in a minimum of time and while the press is running.

While the invention has been described in connection with a Multilith machine, it has in its broader aspects solved a problem of long standing in the offset printing art in a manner which is simple and effective, greatly reducing the time and effort required to secure accurate vertical registration of the printing on the paper on the impression cylinder.

Variations and modifications may be made within the scope of this invention and portions of the improvements may be used without others.

I claim:

1. In an offset printing device having a plate cylinder, a blanket cylinder, an impression cylinder, and means for feeding paper to the impression cylinder in timed relation to the rotation of the impression cylinder, the combination of a driving gear; a gear driven thereby and connected to the impression cylinder to rotate said impression cylinder; gears interconnecting the plate cylinder and blanket cylinder to rotate in predetermined fixed relation; and an adjustable differential driving connecting said driving gear to the interconnected blanket and plate cylinders to simultaneously alter the relative angular relation between said cylinders and the driving gear in response to adjustment of said adjustable driving connection whereby the relative angular position of the blanket cylinder and plate cylinder may be varied simultaneously with respect to the impression cylinder.

2. In an offset printing device having a plate cylinder, a blanket cylinder, an impression cylinder, and means for feeding paper to the impression cylinder in timed relation to the rotation of the impression cylinder, the combination of a driving gear; a gear driven thereby and connected to the impression cylinder to rotate said impression cylinder; gears interconnecting the plate cylinder and blanket cylinder to rotate in predetermined fixed relation; and adjustable differential gearing, including a gear carried by the blanket cylinder, connecting said driving gear with the blanket cylinder to simultaneously alter the relative angular relation between said driving gear and the interconnected blanket and plate cylinders whereby the relative angular position of the blanket cylinder and plate cylinder may be varied simultaneously with respect to the impression cylinder.

3. In an offset printing device having a plate cylinder, a blanket cylinder, an impression cylinder, and means for feeding paper to the impression cylinder in timed relation to the rotation of the impression cylinder, the combination of a driving gear; a gear driven thereby and connected to the impression cylinder to rotate said cylinder; gears interconnecting the plate cylinder and blanket cylinder to rotate in predetermined fixed relation; adjustable gearing connecting the drive gear with the blanket cylinder to alter the relative angular relation between the drive gear and the blanket cylinder, said adjustable gearing including a motor mounted within the blanket cylinder to rotate therewith and an adjustable gear connected to the motor to be driven thereby, said adjustable gear being geared to the driving gear; and control means selectively energizing the motor to rotate the gear connected therewith with respect to the driving gear to simultaneously vary the relative angular position of the blanket cylinder and plate cylinder with respect to the impression cylinder.

4. In an offset printing device having a plate cylinder, a blanket cylinder, an impression cylinder, and means for feeding paper to the impression cylinder in timed relation to the rotation of the impression cylinder, the combination of a driving gear; a gear driven thereby and connected to the impression cylinder to rotate said cylinder; gears interconnecting the plate cylinder and blanket cylinder to rotate in predetermined fixed relation; adjustable gearing connect-

ing the driving gear with the blanket cylinder to alter the relative angular relation between the driving gear and the blanket cylinder, said adjustable gearing including a sun gear coaxial with the blanket cylinder and driven by the driving gear, a planet gear in driving connection with the sun gear and carried by the blanket cylinder, and a motor carried by the blanket cylinder and driving the planet gear; and control means selectively energizing the motor to drive the planet gear to alter simultaneously the relative angular position of the blanket cylinder and plate cylinder with respect to the impression cylinder.

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Certificate of Correction

Patent No. 2,536,679 January 2, 1951

JAMES P. FAY

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows:

Column 4, line 14, after the word "driving" insert *connection*;

and that the said Letters Patent should be read as corrected above, so that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 13th day of March, A. D. 1951.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.