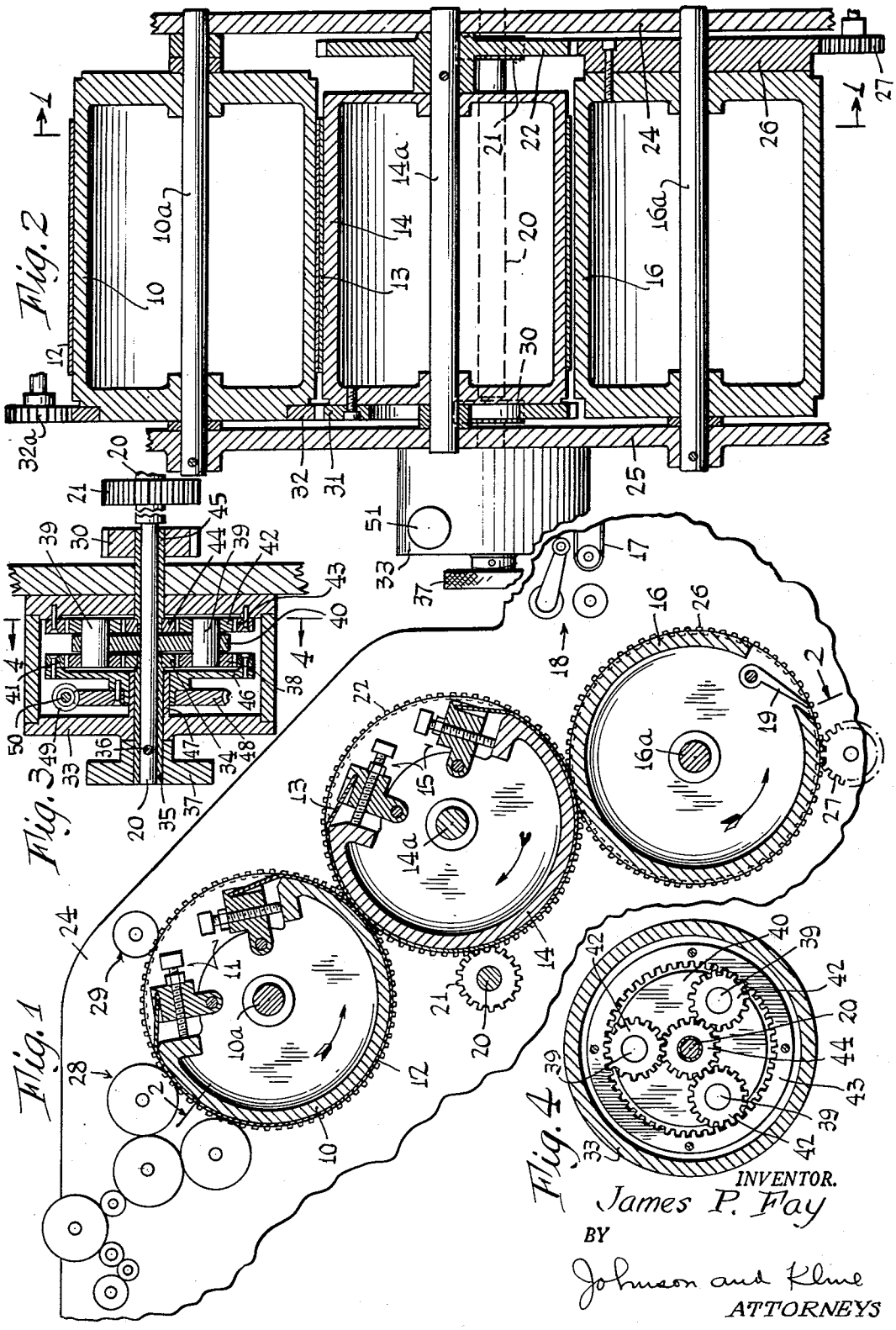
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REGISTERING MECHANISM FOR ROTARY OFFSET PRINTING MACHINES

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REGISTERING MECHANISM FOR ROTARY OFFSET PRINTING MACHINES

James P. Fay, Norwalk, Conn.

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5 Claims. (Cl. 101—248)

The present invention relates to an improved means for obtaining vertical register in an offset printing device and is an improvement on the device shown in my Patent No. 2,536,679 issued January 2, 1951.

In my prior patent an electric motor within the blanket cylinder was disclosed as a means for producing relative movement between the interconnected plate and blanket cylinder and the impression cylinder in order to secure register correction.

It is an object of the present invention to eliminate the use of said electric motor within the blanket cylinder and the attendant slip rings and contacts and controls therefor and to provide a unitary device disposed exteriorly of the cylinders to be readily accessible for quickly adjusting the register in the printing in a simple operation.

This is accomplished according to the present invention by providing in the drive means a gear connected to drive the impression cylinder and a separate gear connected to drive the geared-together plate and blanket cylinders and interconnecting said gears with a manually operated differential mechanism whereby the phase relation of the first and second driving gears may be altered, thus simultaneously altering the relative angular relation between the interconnected blanket and plate cylinders and the impression cylinder.

A feature of the present invention resides in the fact that the differential drive can be mounted exteriorly of the cylinders and when provided with manual control for the differential gear very accurate adjustments of the relative positions between the plate and blanket cylinder and impression cylinder can be obtained during make-up or while the press is running.

The present invention can be built directly into an offset press or can, by a slight modification of an existing press, be incorporated therein.

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 is 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 a longitudinal sectional view through the drive shaft and differential mechanism.

Fig. 4 is a sectional view taken along lines 4—4 of Fig. 3.

As shown in Fig. 1, the plate cylinder **10** is rotatably supported by shaft **10***a* on the main frame and is provided with suitable means **11** for securing a printing plate **12** about the periphery thereof. The plate engages a blanket **13** clamped to the periphery of a blanket cylinder **14** by suitable clamping means **15**, said cylinder being rotatably supported by shaft **14***a* on the main frame. The blanket transfers the image from the plate to the paper, not shown, positioned over the surface of the impression cylinder **16** rotatably supported by shaft **16***a* on the main frame. The paper is fed to the impression cylinder by feed belt **17** and feed rollers **18** and is clamped in position thereon by clamping means **19**.

As shown in Figs. 1 and 2 the main drive means includes a drive shaft **20** rotatably mounted in the frame and located in back of the blanket cylinder and having a first gear **21** secured thereto to rotate therewith. This gear connects to a gear **22** pinned to shaft **14***a* rotatably mounted in the side plates **24**, **25** of the main frame and drives gear **26** which is connected to the impression cylinder to rotate the same. A gear **27** is connected to the gear **26** on the impression cylinder to drive the timing mechanism (not shown) for controlling the feeding of the sheets to the impression cylinder. Also mounted on the drive shaft **20** is a second gear **30** which engages a gear **31** fixed to the blanket cylinder and it is drivingly connected to a gear **32** on the plate cylinder so that these two cylinders are permanently geared together.

The gear **32** is connected to the gear **32***a* and forms the drive for the usual inking mechanism **28** and dampening mechanism **29**. With the inking mechanism thus connected to the plate and blanket cylinders and the paper feed connected to the impression cylinder a drag will be provided on the gearing for these cylinders which will take out back lash therein so that any adjustment of the plate and blanket cylinders with respect to the impression cylinder can be accurately obtained.

Normally the first and second gears are driven in unison from the shaft so that the plate, blanket and impression cylinders rotate in predetermined relation. Should it be desired to alter the relative position between the plate and blanket cylinder and impression cylinder in order to correct errors in vertical register, means are provided for changing the phase relation between gears **21** and **30** which change in phase relation will cause a displacement of the plate and blanket cylinders with respect to the impression cylinder so that proper register may be obtained.

In order to accomplish this the present invention has provided a differential mechanism, preferably manually controlled, connecting the gear **30** to the shaft **20**. In the illustrated form of the invention as shown in detail in Figs. 3 and 4 it will be noted that a housing **33** is provided on the side **25** of the frame and in which an extension of shaft **20** is located. Within the housing a sun gear **34** is secured to a sleeve **35** surrounding the shaft and pinned thereto by pin **36** for rotation therewith. If desired, a handwheel **37** may be provided on the end of the shaft and secured thereto by the pin **36** securing the sleeve to the shaft as shown in Fig. 3. This enables manual operation of the cylinders for the purpose of checking and correcting register. The sun gear engages a set of planet gears **38**, herein illustrated as three gears, rotatably mounted on pins **39** carries by a spider **40** rotatable about the shaft. The planet gears engage a ring gear **41** which is normally fixed. The other end of the pins **39** carried by the spider are provided with planet gears **42** which cooperate with a ring gear **43** fixed to the housing and a sun gear **44** secured to a sleeve **45** connected to the gear **30**. This train of gearing will normally cause the gear **21** which is secured to the shaft and the gear **30**, which is connected to the shaft to the differential mechanism, to rotate in unison.

When it is desired to alter the phase relation between gear **21** and gear **30**, ring gear **41** is made adjustable. This is accomplished by securing gear **41** to a plate **46** rotatable on a bushing **47** in the housing and by connecting to the plate a wormwheel **48** which is adapted to be rotated by a worm **49** carried by a shaft **50** mounted within the housing. The shaft can be rotated by any suitable means as, for example, by a handwheel **51** or the like operator on the outside of the housing.

Thus it will be seen that by rotating the handwheel **51** the normally fixed ring gear **41** may be shifted to produce a gain or loss on the planet gear which will alter the drive to the sun gear **44** connected to the gear **30** and vary

its phase relationship with respect to gear 21. This will change the relative angular relation between the interconnected plate and blanket cylinders and the impression cylinder and thus effect proper register of the printing.

The device of the present invention can be actuated while the machine is in operation or while the machine is being made ready and, if desired, the handwheel 51 may be graduated to show increments of relative change between the plate and blanket cylinders and the impression cylinder so that accurate corrections can be made.

It will be seen that the foregoing invention provides a device which is relatively simple to construct and operate and which accurately produces correction for improper vertical register in the press.

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

I claim:

1. In an offset printing press, a plate cylinder and blanket cylinder geared together at one end of the cylinder for simultaneous rotation; an impression cylinder cooperating with the blanket cylinder and having a driving gear at the other end of the cylinder and means for feeding paper to the impression cylinder in timed relation to the rotation of the impression cylinder, the combination of a drive shaft having a first gear secured thereto adjacent one end of the cylinders and connected to the gear of the impression cylinder to drive the same; a second gear mounted on the shaft for relative rotation with respect to said shaft, said second gear being located adjacent the other end of the cylinders and connected to the gearing connecting the plate and blanket cylinders to drive said plate and blanket cylinders; and means for adjustably connecting said second gear to said shaft and normally operative to rotate said second gear in phase with said first gear to drive said plate, blanket and impression cylinders in unison, said means including a differential mechanism having a manually rotated adjustable gear to alter the phase relation between said first and second gears to simultaneously alter the relative angular relation between said interconnected blanket and plate cylinders and the impression cylinder.

2. In an offset printing press, a plate cylinder and blanket cylinder geared together at one end of the cylinder for simultaneous rotation; an impression cylinder cooperating with the blanket cylinder and having a driving gear at the other end of the cylinder and means for feeding paper to the impression cylinder in timed relation to the rotation of the impression cylinder, the combination of a drive shaft having a first gear secured thereto adjacent one end of the cylinders and connected to the gear of the impression cylinder to drive the same; a second gear mounted on the shaft for relative rotation with respect to said shaft, said second gear being located adjacent the other end of the cylinders and drivingly connected to the gearing connecting the plate and blanket cylinders to drive said plate and blanket cylinders; and means for adjustably connecting said second gear to said shaft and normally operative to rotate said second gear in phase with said first gear to drive said plate, blanket and impression cylinders in unison, said means including a differential mechanism comprising a gear fixed to the shaft to be driven thereby, rotation transmitting gears connecting said gear to the second gear, and manually rotatable adjustable means for controlling the rotation transmitting gears to alter the phase relation between said first and second gears to simultaneously alter the relative angular relation between said interconnected blanket and plate cylinders and the impression cylinder.

3. In an offset printing press, a plate cylinder and blanket cylinder geared together at one end of the cylinder for simultaneous rotation; an impression cylinder cooperating with the blanket cylinder and having a driving gear at the other end of the cylinder and means for feeding paper to the impression cylinder in timed relation to the rotation of the impression cylinder, the combination of a drive shaft having a first gear secured thereto adjacent one end of the cylinders and drivingly connected to the gear of the impression cylinder to drive the same; a second gear mounted on the shaft for relative rotation with respect to said shaft, said second gear being located adjacent the other end of the cylinders and drivingly connected to the gearing connecting the plate and blanket cylinders to drive said plate and blanket cylinders; and means for adjustably connecting said second gear to said shaft and normally operative to rotate said second gear in phase with said first gear to drive said plate, blanket and impression cylinders in unison, said means including a differential mechanism comprising a sun gear fixed to the shaft to be driven thereby, a sun gear connected to the second gear to drive the same, rotation transmitting gears connecting said sun gears including connected planet gears carried by a spider and relatively fixed ring gears engaging the planet gears, and manually adjustable means engaging and shifting the relative positions of said ring gears to alter the phase relation between said first and second gears to simultaneously alter the relative angular relation between said interconnected blanket and plate cylinders and the impression cylinder.

4. In an offset printing press, a plate cylinder and blanket cylinder geared together at one of the cylinder for simultaneous rotation; an impression cylinder cooperating with the blanket cylinder and having a driving gear at the other end of the cylinder and means for feeding paper to the impression cylinder in timed relation to the rotation of the impression cylinder, the combination of a drive shaft having a first gear secured thereto adjacent one end of the cylinders and connected to the gear of the impression cylinder to drive the same; a second gear mounted on the shaft for relative rotation with respect to said shaft, said second gear being located adjacent the other end of the cylinders and connected to the gearing connecting the plate and blanket cylinders to drive said plate and blanket cylinders; and means for adjustably connecting said second gear to said shaft and normally operative to rotate said second gear in phase with said first gear to drive said plate, blanket and impression cylinders in unison, said means including a differential mechanism comprising a sun gear fixed to the shaft to be driven thereby, a sun gear connected to the second gear to drive the same, planet gears carried by a spider engaging the sun gears, normally fixed ring gears engaging the planet gears, and manually operative adjusting means acting upon one of said ring gears for turning the same to alter the phase relation between the sun gears and said first and second gears to simultaneously alter the relative angular relation between said interconnected blanket and plate cylinders and the impression cylinder.

5. In an offset printing press, a plate cylinder and blanket cylinder geared together at one end of the cylinder for simultaneous rotation; an impression cylinder cooperating with the blanket cylinder and having a driving gear at the other end of the cylinder and means for feeding paper to the impression cylinder in timed relation to the rotation of the impression cylinder, the combination of a drive shaft having a first gear secured thereto adjacent one end of the cylinders and connected to the gear of the impression cylinder to drive the same; a second gear mounted on the shaft for relative rotation with respect to said shaft, said second gear being located adjacent the other end of the cylinders and connected to the gearing connecting the plate and blanket cylinders to drive said plate and blanket cylinders; and means for adjustably connecting said second gear to said shaft and normally operative to rotate said second gear in phase with said first gear to drive said plate, blanket and impression cylinders in unison, said means including a double differential mechanism having sun, planet and normally stationary ring gears with one of said sun gears being connected to the second gear and one of said ring gears having a worm

and wormwheel connected thereto, said worm being manually actuated and adjustable to shift the connected ring gear and alter the phase relation between said first and second gears to simultaneously alter the relative angular relation between said interconnected blanket and plate cylinders and the impression cylinder.

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