July 17, 1951 E. L. HARLEY 2,561,115

MACHINE FOR AND METHOD OF REGISTERING PRINTING PLATES

Filed Jan. 4, 1949 2 Sheets-Sheet 1

Fig. 2.

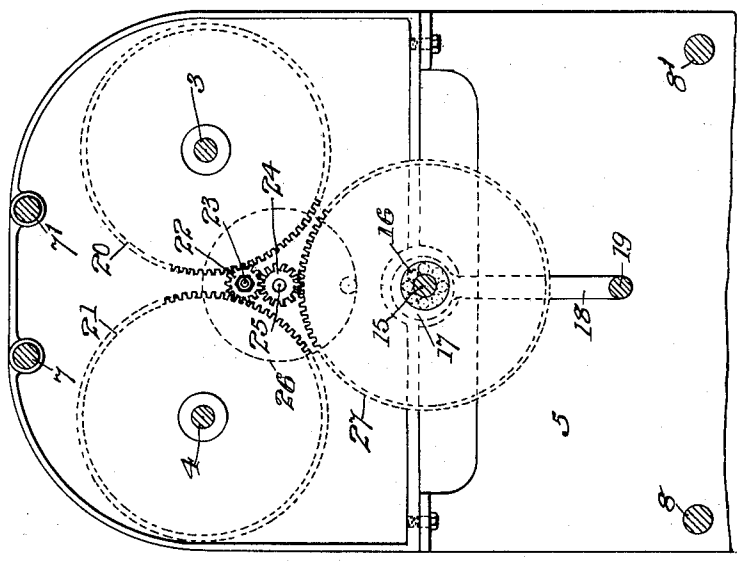


Fig. 6.



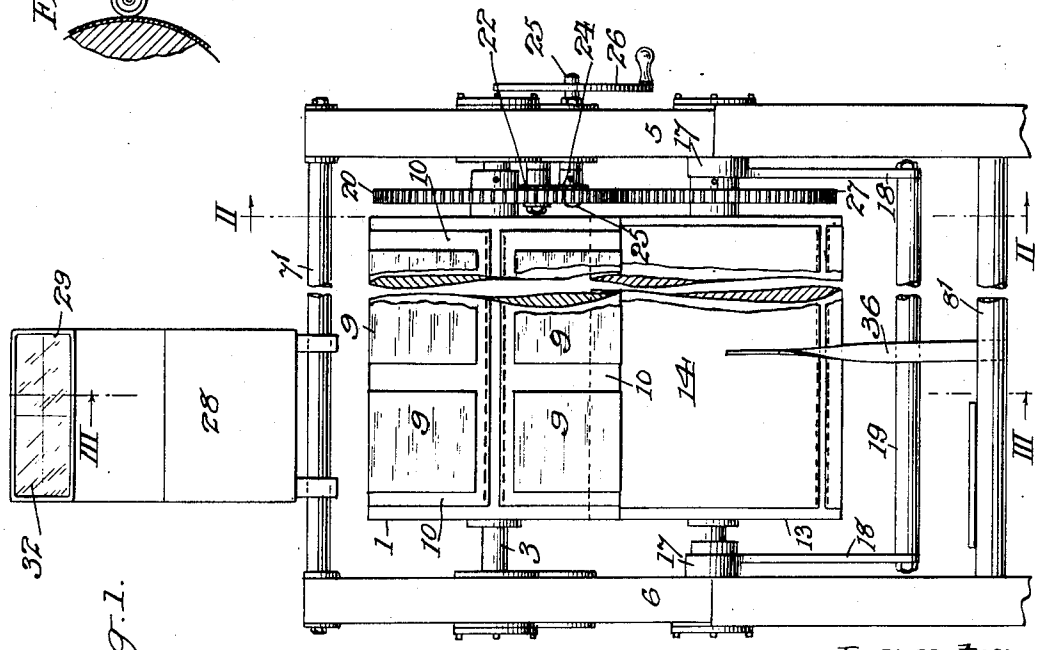


Fig. 1.

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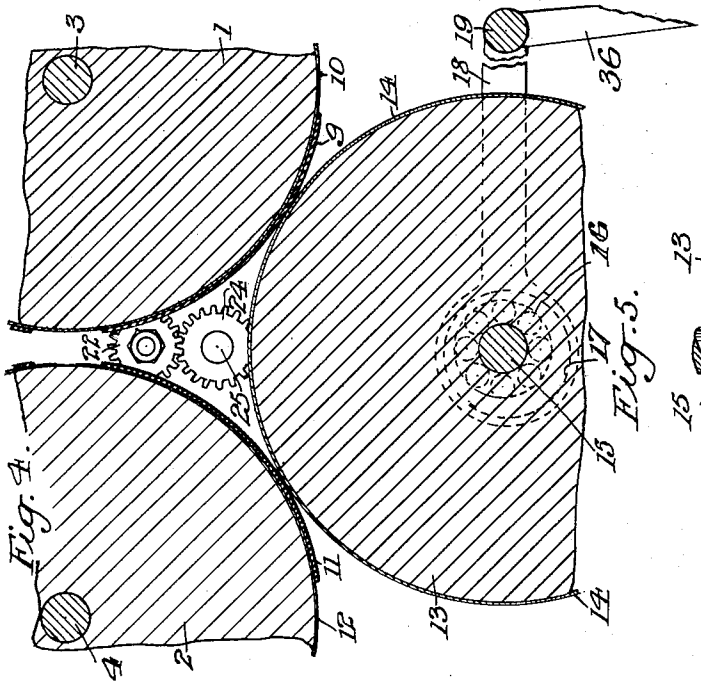


Fig. 4.

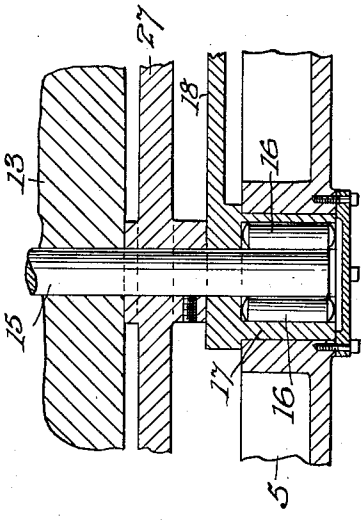


Fig. 5.

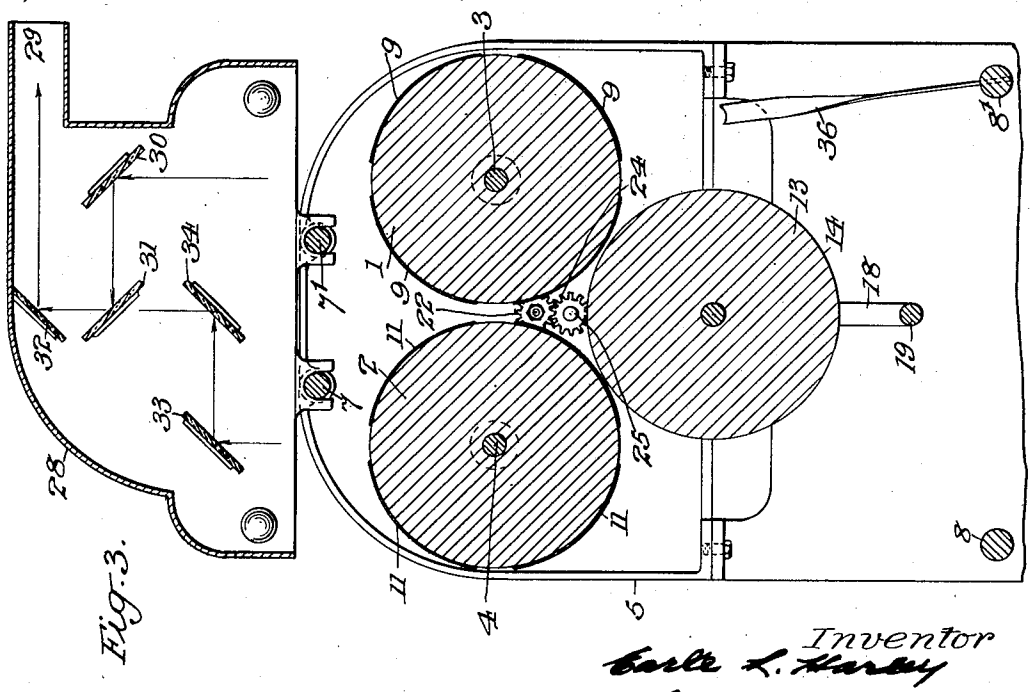


Fig. 3.

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UNITED STATES PATENT OFFICE

2,561,115

MACHINE FOR AND METHOD OF REGISTERING PRINTING PLATES

Earle L. Harley, Brooklyn, N. Y.

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5 Claims. (Cl. 101—174)

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My invention is directed to a novel machine for and a novel method of registering color printing plates which are to be subsequently removed for use in multicolor printing presses.

My invention includes a machine in which the printing plates are secured to backing sheets which have been removably fastened on two parallel cylinders arranged side by side in the machine.

My invention also includes a mirror unit which is mounted on the machine for use in registering one set of color plates with their other set of coacting printing plates.

My invention also includes means for rotating the cylinders step by step in unison in the same direction for permitting the registration of different pairs of coacting plates carried by the cylinder backing sheets.

My invention also includes a third cylinder located beneath and parallel with the two plate carrying cylinders, which lower cylinder is adapted to have a proof sheet removably attached thereto.

My invention also includes means for operatively connecting the proof sheet carrying cylinder to the plate carrying cylinders whereby the proof sheet carrying cylinder may be rotated in unison with the said plate carrying cylinders.

My invention also includes means for moving the proof sheet carrying cylinder bodily to bring its proof sheet into printing contact with the registered plates on the plate carrying cylinders after said plates have been inked, whereby the printing effects and plate registry may be observed on the proof sheet before the printing plates with their backing sheets are removed from their cylinders.

A practical means for carrying out my invention is represented in the accompanying drawings, in which

Fig. 1 represents a front end view of the machine with an intermediate portion broken away showing plates for printing one color secured to a backing sheet removably fastened to the first cylinder and registered plates for printing another color secured to a backing sheet removably fastened to the second cylinder, the third cylinder with its proof sheet being lowered out of contact with the plates carried by the first two cylinders;

Fig. 2 represents a cross section taken in the plane of the line II—II of Fig. 1, looking in the direction of the arrows;

Fig. 3 represents a cross section taken in the plane of the line III—III of Fig. 1, looking in the direction of the arrows;

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Fig. 4 represents a detail section on an enlarged scale showing the proof sheet carrying cylinder raised to its printing position;

Fig. 5 represents a detail section showing one of the eccentric mountings for the shaft of the proof sheet carrying cylinder; and

Fig. 6 represents a detail view showing a plate and a brayer for inking the same.

Two parallel cylinders 1 and 2 arranged side by side have their shafts 3 and 4 rotatably mounted in the side frames 5 and 6 of the machine, which side frames are shown as being rigidly connected by upper tie rods 7 and 7' and lower tie rods 8 and 8'.

The plates 9 of flexible material, as rubber, for printing one color are secured, as by an adhesive, to a flexible backing sheet 10 which is removably fastened around the cylinder 1 as by staples.

The plates 11 of flexible material, as rubber, for printing another color are secured, as by an adhesive, to a flexible backing sheet 12 which is removably fastened around the cylinder 2, as by staples.

A third cylinder 13 is located beneath and parallel to the two upper plate carrying cylinders 1 and 2. A flexible proof sheet 14 of suitable material, as paper, is removably fastened around this third cylinder 13, as by staples. The shaft 15 of this third cylinder 13 is rotatably mounted by interposed roller bearings 16, in eccentric bearings 17 which are in turn rotatably mounted in side frames 5 and 6. These eccentric bearings 17 are provided with arms 18 connected across the machine by a handle bar 19 which serves as a means for rocking the eccentric bearings 17 for raising the shaft 15 and its cylinder 13 to bring the proof sheet 14 into printing contact with the plates 9 and 11 on the removable backing sheets 10 and 12 on the cylinders 1 and 2.

These three cylinders 1, 2 and 13 which may be of wood or other suitable material are rotated step by step for registering different pairs of plates around the cylinders 1 and 2. They also are rotated together after plates have been inked to cause the proof sheet 1 to be printed in two colors. The means for rotating these cylinders includes the following element:

The cylinders 1 and 2 are provided with spur gears 20 and 21 which mesh with a pinion 22 whose shaft 23 is rotatably mounted in the side frame 6. This pinion 22 meshes with the pinion 24 on the shaft 25 of a hand wheel 26. This shaft 25 is also rotatably mounted in the side frame 5. The proof sheet carrying cylinder 13 is provided with a spur gear 27 which meshes at all times with the pinion 24.

The mirror unit is shown as including a housing 28 open at its front to provide an observation window 29. This housing is also open at its bottom. This mirror unit is mounted on the machine frame above the upper plate carrying cylinders 1 and 2 to slide lengthwise thereof on the two upper tie rods 7 and 7'.

The mirrors for reflecting the superimposed images of the pairs of coacting plates 9 and 11 on the upper cylinders 1 and 2 through the window 29 to the eye of an observer, are arranged in the housing 28 as follows:

An inclined non-transparent mirror 30 is located over the upper cylinder 1 in position to horizontally reflect the image of a first color printing plate 9 on the first cylinder 1 to an inclined transparent mirror 31. This mirror 31 vertically reflects the said image to an inclined non-transparent mirror 32. This mirror 32 horizontally reflects the image through the window 29 to the eye of the observer. An inclined non-transparent mirror 33 is located over the coacting printing plate 11 on the second upper cylinder 2 in position to horizontally reflect the image of said plate 11 to the non-transparent mirror 34. This mirror 34 vertically reflects the image of said plate 11 through the inclined transparent mirror 31 to the non-transparent mirror 32. This mirror 32 will horizontally reflect its image in superimposed relation with the image reflected from the coacting plate 9 on the upper cylinder 1 through said window 29 to the eye of the observer. The mirror unit will thus ensure the exact registration of the plate 11 on the second cylinder 2 with its coacting plate 9 on the first cylinder 1. This mirror unit is movable along the two upper tie rods 7, 7' and the two cylinders 1 and 2 are rotatable step by step in unison in the same direction to reflect the superimposed images of different pairs of coacting plates 9 and 11 along and around the two upper plate carrying cylinders 1 and 2 to the eye of the observer, for accurate registration of all of the plates along and around both cylinders.

In practice; the backing sheets 10 and 12 are temporarily fastened around their cylinders 1 and 2 and the proof sheet 14 is temporarily fastened around its cylinder 15. The plates 9 for the first color may be secured to their mounting sheet 10 along and around the cylinder 1 in their proper positions without the use of the mirror unit. The plates 11 for the second color printing are then secured one by one on their mounting sheet 12 along and around their cylinder 2 in accurate register with their coacting plates 9 on the cylinder 1 by the use of the mirror unit.

After all of the pairs of coacting plates on the two upper cylinders have been exactly registered and mounted the plates may be inked with the desired colors by a suitable brayer 35 and the use of a color supply (not shown). The handle bar 19, with its arms 18 and eccentric bearings 17, is then rocked upwardly from its normal hanging position shown in Fig. 1 to the position shown in Fig. 4 to raise the lower cylinder 13 to bring its proof sheet 14 into printing contact with the plates on the first and second printing cylinders. A spring latch bar 36 is secured to the cross bar 8' in position to engage the handle bar 19 and removably hold it in its raised position. The three cylinders are then rotated one revolution by the hand wheel 26 to cause the plates to print on the proof sheet in two colors. The cylinder 13 may then be lowered and the printed proof sheet detached therefrom for observation as to color effect, registry, etc. The plate mounted sheets 10 and 12 may then be detached from their respective cylinders 1 and 2 for use thereafter on the printing cylinders of a suitable rotary printing press.

It is evident that various changes may be resorted to in the construction, form and arrangement of the several parts without departing from the spirit and scope of my invention, and hence I do not intend to be limited to the particular embodiment herein shown and described.

What I claim is:

1. In combination, a frame, first, second and third cylinders permanently mounted therein, the first and second cylinders being located side by side and the third cylinder being located beneath the first and second cylinders, means for rotating the said cylinders in unison, flexible backing sheets removably fastened around the first and second cylinders and a proof sheet removably fastened around the third cylinder, flexible color printing plates, plates for printing one color being secured to the backing sheet on the first cylinder, and plates for printing another color being secured to the backing sheet on the second cylinder in register with their corresponding plates on the first cylinder backing sheet, a mirror unit mounted on the frame in position to reflect the superimposed images of corresponding plates on the two backing sheets to a predetermined observation point, means for inking the plates, and means for moving the third cylinder with its proof sheet upwardly into printing contact with the plates to be printed thereby before the backing sheets with their registered printing plates are removed from their first and second cylinders.

2. In combination, a frame, first, second and third cylinders permanently mounted therein, the first and second cylinders being located side by side and the third cylinder being located beneath the first and second cylinders, means for rotating the said cylinders in unison comprising non-meshing gears on the first, second and third cylinders, a pinion meshing with the first and second cylinder gears and a manually operated second pinion meshing with the third cylinder gear and with the first named pinion, flexible backing sheets removably fastened around the first and second cylinders and a proof sheet removably fastened around the third cylinder, flexible color printing plates, the plates for printing in one color being secured to the backing sheet on the first cylinder, and the plates for printing another color being secured to the backing sheet on the second cylinder with their corresponding plates on the first cylinder backing sheet, a mirror unit mounted on the frame in position to reflect the superimposed images of corresponding plates on the two sheets, to a predetermined observation point, means for inking the plates, and means for moving the third cylinder with its proof sheet upwardly into printing contact with the plates to be printed thereby before the backing sheets with their registered printing plates are removed from their first and second cylinders.

3. In combination, a frame, first, second and third cylinders permanently mounted therein, the first and second cylinders being located side by side and the third cylinder being located beneath the first and second cylinders, means for rotating the said cylinders in unison, flexible backing sheets removably fastened around the first and

second cylinders and a proof sheet removably fastened around the third cylinder, flexible color printing plates, the plates for printing one color being secured to the backing sheet on the first cylinder, and the plates for printing another color being secured to the backing sheet on the second cylinder in register with their corresponding plates on the first cylinder backing sheet, a mirror unit mounted on the frame to be moved lengthwise of the cylinders into different positions to reflect the superimposed images of different pairs of corresponding plates on the two backing sheets, to a predetermined point, means for inking the plates, and means for moving the third cylinder with its proof sheet upwardly into printing contact with the plates to be printed thereby before the backing sheets with their registered printing plates are removed from their first and second cylinders.

4. In combination, a frame, first, second and third cylinders permanently mounted therein, the first and second cylinders being located side by side and the third cylinder being located beneath the first and second cylinders, means for rotating the said cylinders in unison comprising gears on the first, second and third cylinders, a pinion meshing with the first and second cylinder gears and a manually operated second pinion meshing with the third cylinder gear and with the first named pinion, flexible backing sheets removably fastened around the first and second cylinders and a proof sheet fastened around the third cylinder, flexible color printing plates, the plates for printing one color being secured to the backing sheet on the first cylinder, and the plates for printing another color being secured to the backing sheets on the second cylinder in register with their corresponding plates on the first cylinder backing sheet, a mirror unit mounted on the frame to be moved lengthwise of the cylinders into different positions to reflect the superimposed images of different pairs of corresponding plates on the two backing sheets to a predetermined

point, means for inking the plates, and means for moving the third cylinder with its proof sheet upwardly into printing contact with the plates to be printed thereby before the backing sheets with their registered printing plates are removed from their first and second cylinders.

5. The herein described method which includes, temporarily fastening backing sheets around first and second cylinders and temporarily fastening a proof sheet around a third cylinder, securing first color flexible printing plates to the first cylinder backing sheet in the desired positions thereon, securing second color flexible printing plates to the second cylinder backing sheet in accurate register with their coacting printing plates on the first cylinder by the use of a mirror unit, inking the color plates on both backing sheets, raising the third cylinder to bring its proof sheet into printing contact with the inked plates on the first and second cylinders, rotating the three cylinders to cause the plates to print in two colors on the proof sheet, lowering the third cylinder, detaching the printed proof sheet therefrom, and finally detaching the two plated backing sheets for further use in a suitable rotary color printing press.

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