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A. O. GARDNER

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PRINTING PLATE REGISTERING DEVICE

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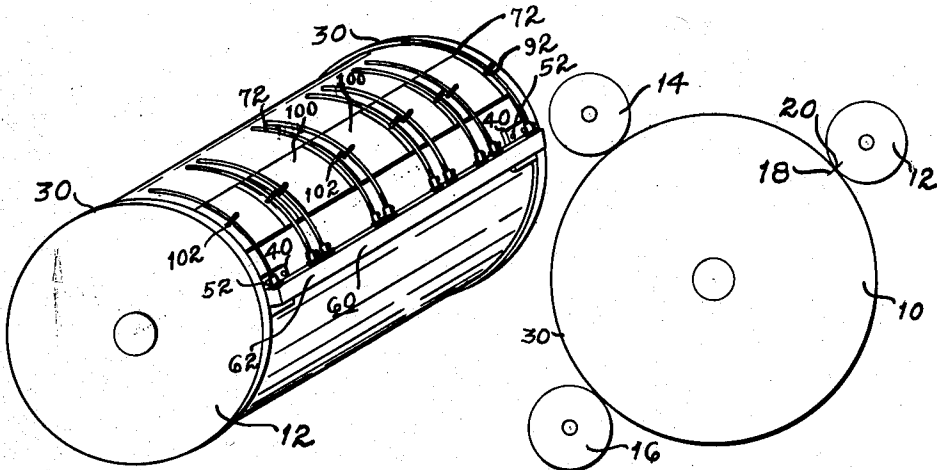


FIG. 1

FIG. 2

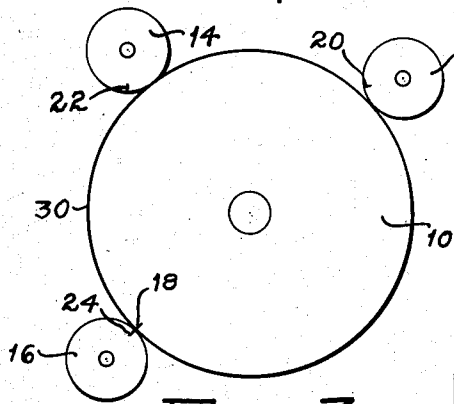


FIG. 3

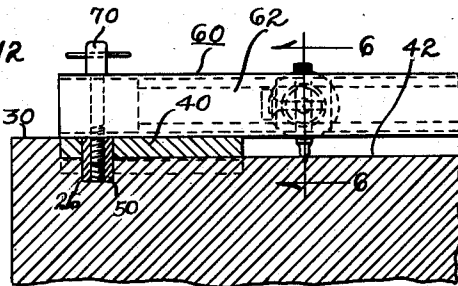


FIG. 5

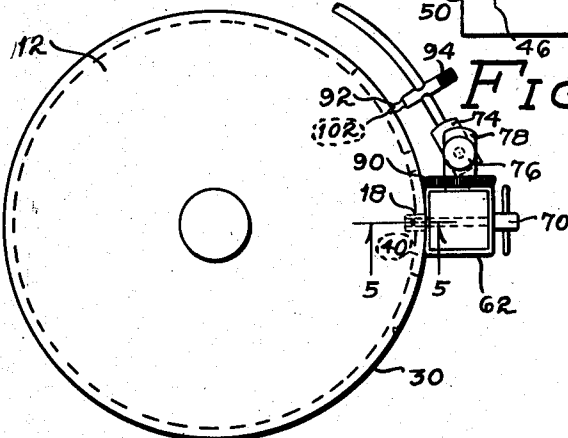


FIG. 6

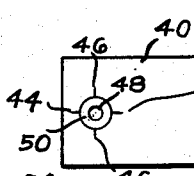


FIG. 7

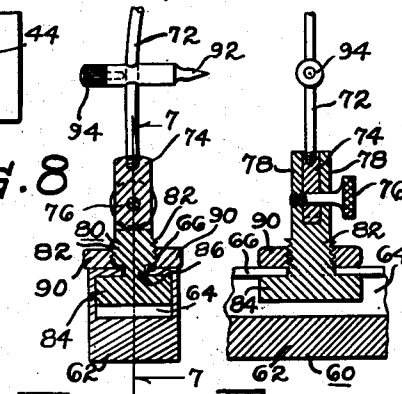


FIG. 8

INVENTOR.
Arthur O. Gardner
BY *Dybvig & Dybvig*
His Attorney

UNITED STATES PATENT OFFICE

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PRINTING PLATE REGISTERING DEVICE

Arthur O. Gardner, Dayton, Ohio, assignor of thirty per cent to Homer L. Bishop and Earl E. Stansell, doing business as Bishop-Stansell Company, West Carrollton, Ohio

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3 Claims. (Cl. 33—184.5)

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This invention relates to apparatus for locating printing plates on a printing cylinder and more particularly to positioning or locating printing plates on the several printing cylinders of a multicolor press so that the printing plates mounted upon the several printing cylinders are in proper registry, although the invention is not necessarily so limited.

In the use of multi-color printing presses, it requires several days for the pressmen to mount and properly align the printing plates on the several printing cylinders in such a manner that proper registry is effected. Generally, this is effected by the cut-and-try method. First, the printing plates are mounted on the black printing cylinder. An impression is then made upon the web that is fed through the press. The printing plates on the colored printing cylinder are then mounted in position, impressions made, the plates adjusted until a satisfactory registry is obtained. This is a slow, tedious process, resulting in a waste of labor and a considerable amount of paper.

Attempts have been made to provide various devices for mounting the printing plates in proper registry upon the several cylinders of a multi-color printing press; but as far as known, none of these devices have been commercially successful.

An object of this invention is to provide a process of mounting printing plates on the printing cylinders of a multi-color printing press by the use of positioning instrumentalities, so as to greatly reduce the time required for mounting the printing plates on the several printing cylinders in accurate registry.

Another object of this invention is to produce accurately positioned locating points on the several printing cylinders of a multi-color press in such a manner that the printing plates may be mounted in proper registry on the several cylinders without long drawn out, tedious and labor-consuming cut-and-try methods.

Another object of this invention is to provide attachments for the several printing cylinders of the multi-color printing press, which attachments are mounted in the same relative position on the several cylinders, so that the attachments may be used in cooperation with a gauge removably attached to the attachments upon the several cylinders in seriatim, which gauge is used in conjunction with registration marks or recesses on the printing plates, to thereby accurately position the several printing plates in proper registry so as to eliminate the usual cut-and-try methods.

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Other objects and advantages reside in the construction of parts, the combination thereof and the mode of operation, as will become more apparent from the following description.

Referring to the drawings, Figure 1 is a perspective view of a printing cylinder having a gauge removably attached thereto for accurately positioning the printing plates on the printing cylinders.

Figure 2 is a schematic end view of a packing cylinder provided with a plurality of printing cylinders used to illustrate the first step and the process of locating the registration gauge.

Figure 3 is another schematic view, similar to Figure 2, showing the packing cylinder in the position used in applying a registration mark to a succeeding printing cylinder.

Figure 4 is an enlarged end view of a printing cylinder showing the registration gauge attachment removably attached to a printing cylinder.

Figure 5 is a fragmentary cross sectional view, taken substantially on the line 5—5 of Figure 4 rotated through an angle of 90°.

Figure 6 is a vertical cross sectional view of the gauge attachment, taken substantially on the line 6—6 of Figure 5.

Figure 7 is another vertical cross sectional view of the gauge assembly, taken substantially on the line 7—7 of Figure 6.

Figure 8 is a perspective view of an attachment adapted to be mounted upon a printing cylinder.

Figures 2 and 3 are drawn to a smaller scale than Figure 1. Figure 4 is drawn to a larger scale than Figure 1. Figures 5 and 6 are greatly enlarged cross sectional views.

In the drawings, the reference character 10 indicates a packing cylinder of a multi-color press mounted for rotation at substantially the same peripheral speed as the peripheral speed of the printing surface of the printing cylinders 12, 14 and 16.

As may best be seen by referring to Figure 2, a score line or mark 18 is cut into the end of the packing cylinder 10 in alignment with a score line or mark 20 in the end of the printing cylinder 12. These score lines, when being positioned, coincide with a line extending from the axis of rotation of the packing cylinder 10 to the axis of rotation of the printing cylinder 12. The packing cylinder 10 and the printing cylinders 12, 14 and 16 are connected together by suitable gears, so that the peripheral speed of the several cylinders is substantially the same. Furthermore, the circumference of the packing cylinder 10 is a whole number multiple of the

circumference of the printing cylinders 12, 14 and 16, so that for each revolution of the packing cylinder 10, each of the printing cylinders makes a whole number multiple of revolutions.

After the marks 18 and 20 have been cut into the cylinders 10 and 12 respectively, the packing cylinder 10 is rotated until it is in registry with a line joining the axis of rotation of the packing cylinder 10 to the axis of rotation of the printing cylinder 14. A score line or mark 22 is then cut in the end of the printing cylinder 14 in alignment with the mark 18. The packing cylinder 10 is then rotated into the position shown in Figure 3, so that the mark 18 coincides with a line extending from the axis of rotation of the packing cylinder 10 to the axis of rotation of the printing cylinder 16. A score line or mark 24 is then cut in the end of the printing cylinder 16 in alignment with the mark 18.

An aperture 26 is drilled in proper position adjacent each end of the printing cylinders. This aperture 26 has its center located in a diametrical plane coaxial with the axis of rotation of the printing cylinder and passing through the mark 20, 22 or 24 as the case may be. These apertures 26 are equally spaced laterally from the bearer 30 found on each end of each printing cylinder. After the apertures 26 have been drilled in the periphery of the printing cylinders, suitable attachments are permanently attached to each of the cylinders. These attachments include an arcuate plate 40 having an inner radius of curvature corresponding to the radius of curvature of the plate-receiving surface 42 of the printing cylinder. The thickness of the plate 40 is substantially equal to or slightly less than the thickness of the printing plate.

As may best be seen by referring to Figure 3, each of the plates 40 is provided with longitudinally extending score lines 44 and transversely disposed score lines 46, all passing through the center of an aperture 48 in a brass screw threaded tubular sleeve 50 fixedly attached to the plate 40. This screw threaded brass sleeve 50 projects into the aperture 26. The score lines 44 are aligned with the marks 20, 22 or 24, depending upon which cylinder is under consideration. The score line 46 is mounted in predetermined, spaced relation from the inner margin of the bearer 30.

After the arcuate plate 40 has been properly positioned, it is secured in this position by a plurality of screws 52 shown in Figure 1. Each of the printing cylinders is provided with a pair of arcuate plates 40, all accurately positioned with respect to the score lines 20, 22 and 24. Identical score lines are preferably cut into both ends of all of the cylinders.

A removably mounted gauge assembly 60 is used in cooperation with the attachments to each of the printing cylinders for mounting the plates in registry upon the respective printing cylinders. The attachment is first mounted upon the printing cylinder 12, which will be referred to as the black cylinder, in that the plates used in making the black impression are mounted on this cylinder. The removably mounted gauge 60 includes a transverse bar 62 provided with a rectangular channel-like slot 64 extending longitudinally throughout its length, or substantially so. A longitudinally extending slot 66 provides an opening in the side of the bar 62 into the slot 64. The slot 66, together with the slot 64, forms a substantially T-shaped opening.

The transverse bar 62 is removably attached to a printing cylinder by means of the thread-

ed screws 70 extending through the ends of the bar 62 and threadedly engaging the tubular sleeve 50 permanently attached to the printing cylinder. The ends of the bar 64 are preferably solid, so as to provide a solid portion surrounding the screws 70. This transverse bar 62 supports a plurality of gauge arms 72, each threadedly engaging a hinge member 74 mounted upon a screw 76 passing through the furcations 78 of a bifurcated member 80. Member 80 has a threaded cylindrical portion 82 and a square head 84 arranged in spaced relation from the threaded portion 82 by a reduced portion 86. The reduced portion 86 is positioned in the slot 66 and the square head 84 is snugly seated in the opening 64. A nut 90 threadedly engages the threaded portion 82 and is used in cooperation with the head 84 to clamp the gauge arm in proper position on the bar 62. The arm 72 supports an adjustably mounted pointer 92, held in adjusted position by a knurled set screw 94. This pointer 92 may be adjusted longitudinally on the arm 72, so as to be positioned in any desired place.

The black plates represented by the reference numeral 100 are each provided with accurately positioned conically shaped registration recesses or apertures 102 in the margins of the plates. These recesses function as registration marks on the plates. These apertures 102 are positioned in the shell used in manufacturing electrotypes. Furthermore, the apertures 102 are all positioned in the same relative position on all of the corresponding plates for the several colors, so that if the apertures or recesses 102 are properly positioned with respect to the score lines 20, 22 and 24, the plates on the several printing cylinders will be accurately registered when printing upon the web or paper.

The black plates 100 are accurately aligned on the cylinder 12. The pointers 92 on the gauge arm 72 are adjusted so as to be positioned in the recesses 102, there being one pointer for each recess, there being two recesses for each plate, the recesses being positioned in the margins of the plates beyond the printing surface. After the pointers 92 have been accurately positioned in the recesses of the black plates aligned across the black printing cylinder 12 and properly secured in position, the gauge assembly 60 is then removed from the black cylinder 12.

The gauge assembly 60 may then be attached to the color printing cylinder 14 in readiness to align the colored printing plates on the cylinder 14. These colored printing plates are provided with apertures 102 in the margins in a manner identical to those found on the black plates. By arranging the colored plates in such a manner that the pointers 92 register with the apertures 102 on the colored plates for the particular color used on the cylinder 14, these colored plates are secured in position in any conventional manner known to those skilled in the art.

The gauge assembly 60 is then removed from the cylinder 14 and attached to the succeeding cylinder 16 in the same manner, without making any adjustments of the pointers and the gauge arms. The color plates to be used on the cylinder 16 are then so positioned that the pointers 92 drop into the respective recesses 102 to properly align the plates. As soon as these plates have been aligned, they are locked in position, the gauge is removed, the operation repeated upon succeeding cylinders not shown, until all of the plates have been mounted in position. The

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gauge assembly is mounted upon and removed from the printing cylinders in seriatim.

Upon the web being fed through the printing press by the packing cylinder and the respective printing cylinders rotating so as to pull a proof, it will be found that all of the plates on the printing press make impressions superimposed upon each other substantially in registry. It may be necessary to make slight adjustments of some of the plates in the event the pressman has failed to properly position the plates. If the pressman has carefully followed the proper method of mounting the plates, as described above, the plates should all register within allowable tolerances. As the cylinders are rotated, the printing cylinders print impressions in registry in seriatim.

It has been found that this process results in the printing plates being positioned upon the printing cylinders within a period of a few hours instead of several days, as has been the common practice in the past.

In the modification disclosed in the drawings, a curved arm 72 projects from one side of the bar 62.

Although the preferred embodiment of the device has been described, it will be understood that within the purview of this invention various changes may be made in the form, details, proportion and arrangement of parts, the combination thereof and mode of operation, which generally stated consist in a device capable of carrying out the objects set forth, as disclosed and defined in the appended claims.

Having thus described my invention, I claim:

1. An attachment for use in mounting a set of multicolor printing plates upon the printing cylinders of a printing press, said printing plates having registration recesses in the margins thereof, said attachment including a pair of plates fixedly attached to the opposite ends of each printing cylinder, each of the plates having a threaded aperture, a removably mounted registration gauge assembly, said gauge assembly including a transverse bar having apertures adjacent each end thereof, bolts passing through the apertures of the bar and threadably engaging the plates of a cylinder for removably securing the bar to the printing cylinder, said bar being pro-

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vided with a longitudinally extending substantially T-shaped slot, the opening into the slot extending in one side of the bar, supporting members adjustably mounted in the slot, each of said supporting members being provided with a bifurcated end, arcuate arms pivotally mounted between the furcations of the supporting members, each of the arcuate arms having adjustably mounted thereon pointers adapted to be aligned with the registration recesses in the margins of the printing plates, and means for securing the pointers in adjusted position upon the arms so that the gauge assembly may be moved from one cylinder to another for aligning the plates of a set upon the several printing cylinders.

2. An attachment according to claim 1 wherein each of the supporting members is substantially T-shaped with the head mounted in the slot, the stem of the T projecting outwardly through the opening, the stem being circular and provided with threads, and a nut for threadably engaging the threads upon the stem for locking the supporting members in position upon the bar.

3. An attachment according to claim 1 wherein each of said arcuate arms consists of a hinge member pivotally mounted between the furcations of the supporting member, said hinge member having a threaded aperture, and an arcuate member terminating in a threaded end threadably engaging the hinge member.

ARTHUR O. GARDNER.

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