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3,456,587

PLATE CYLINDER WITH RETRACTABLE REGISTER PINS

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2 Sheets-Sheet 1

Fig. 1.

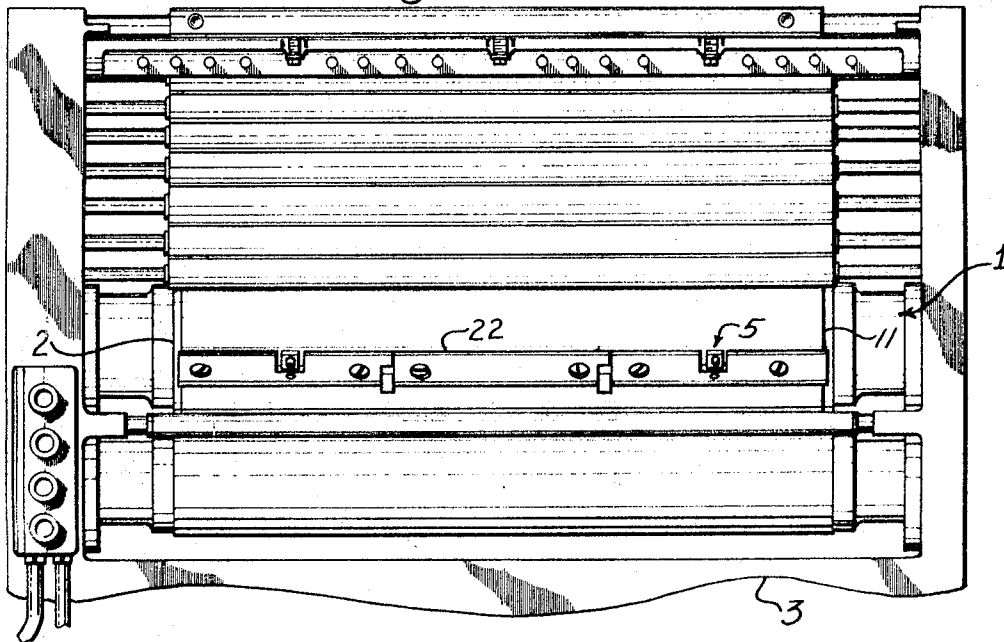
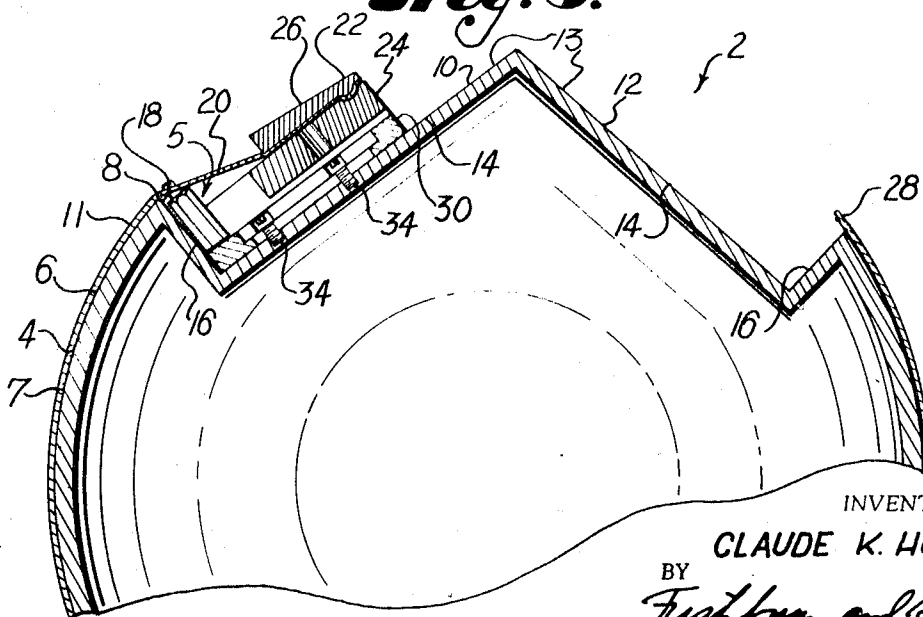


Fig. 3.



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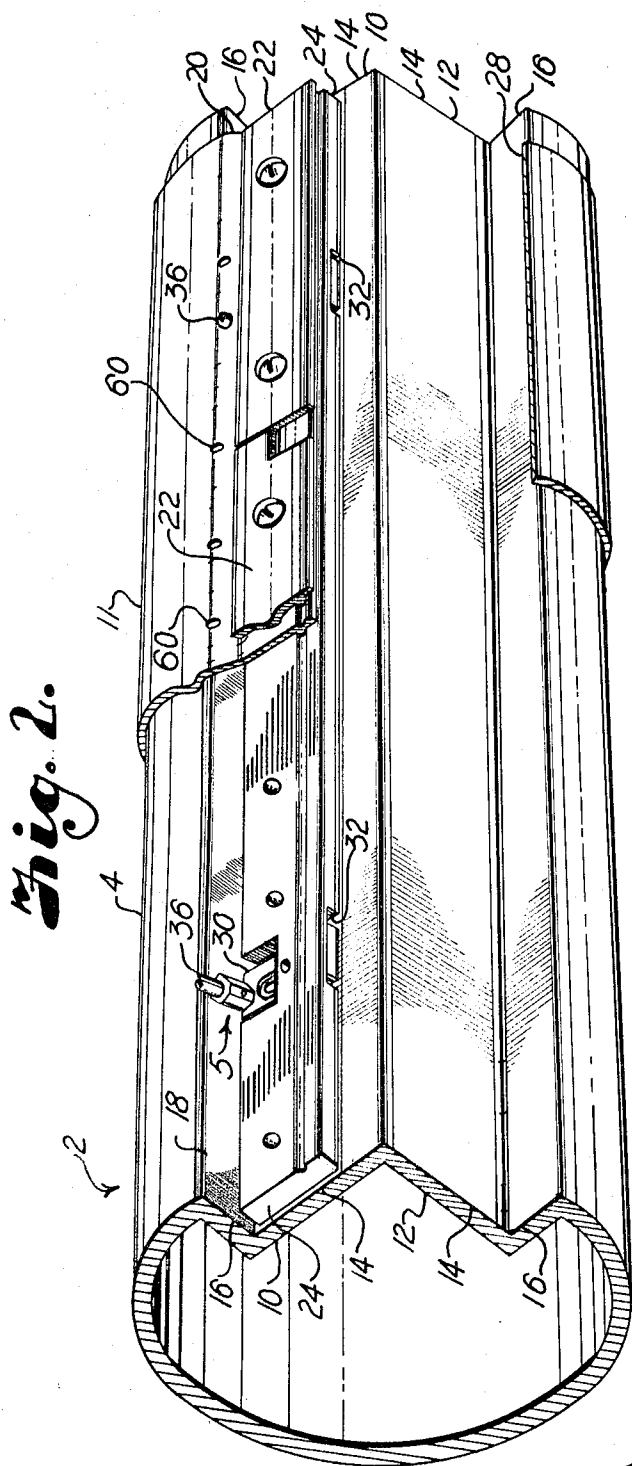
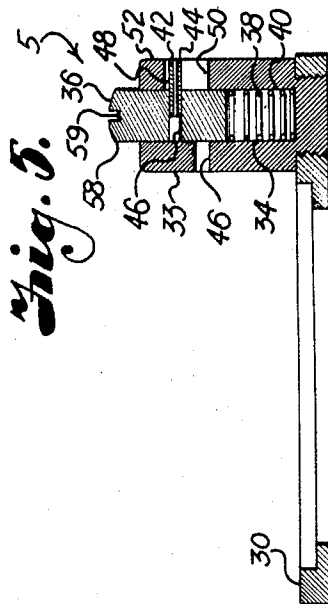
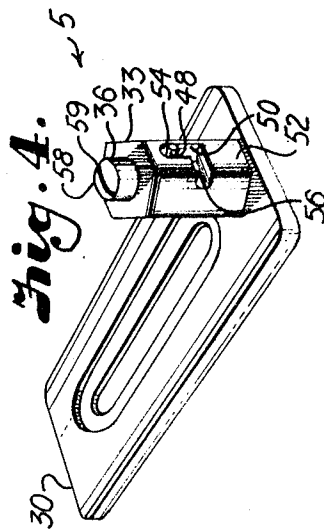
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PLATE CYLINDER WITH RETRACTABLE REGISTER PINS

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2 Sheets-Sheet 2



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PLATE CYLINDER WITH RETRACTABLE
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4 Claims

ABSTRACT OF THE DISCLOSURE

An alignment apparatus for accurate positioning of plates and the like on a positioning surface and particularly for accurately positioning plates on a plate cylinder of a printing press wherein the plates have accurately spaced register apertures therein. In a printing press having longitudinally extending cavities or recesses therein and conventional plate grippers for securing a printing plate in a selected position on a cylinder, brackets are secured to the cylinder in spaced relation in such cavities and adjusted to position register pin assemblies carried by the respective brackets in proper spaced relation axially of the cylinder. The register pin assemblies are also located in the cavity portion with the pin assemblies each including housings having a bore in which register pins are slidably mounted, the pins extending perpendicular to the plane of the plate mounting portion of the cylinder. The pins are retractable to a retracted position with engaging portions on the housing and pins to retain the pins in either extended or retracted position. Springs are located in the bores of the housings to urge the pins into extended position and when extended the pins are adapted to be received through accurately positioned apertures in the printing plate to position same on the cylinder whereby the plate can then be secured by the gripper means.

This invention relates to printing and more particularly, to a method and apparatus for the alignment of plates, negatives or the like on a positioning surface.

Heretofore, various methods have been employed to align or position lithographic plates, negatives or the like employing various forms of apparatus; however, these methods have generally lacked the consistency of accuracy required in printing operations. In such operations as multicolor offset printing, each color plate must be accurately aligned or positioned in exactly the same location on the plate cylinder of the press as each of the other color plates utilized in order to produce a properly colored printed image. Minor variations in the positioning of the plates result in an offsetting of the various colors from their desired position resulting in distortions in the printed image.

The principal objects of this invention are: to alleviate the aforementioned difficulties in the art by providing a novel method and apparatus for the positioning of plates, negatives or the like in an exact location on an alignment or positioning surface; to provide such a method and apparatus wherein a plurality of objects such as color plates each have the copy in the same orientation and position and said plates may be accurately positioned on an alignment or positioning surface such as a printing plate cylinder whereby each plate is mounted to said cylinder in exactly the same location in said cylinder as all other plates for exact registration; to provide such an apparatus having a registering or aligning means such as a pin or other protruding member which intersects the plane of an aligning or positioning surface on which a plate, negative or the like is

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supported to position said plate, negative or the like by passing said pins through a plurality of accurately punched holes in said plate, negative or the like; to provide such an apparatus including at least two registration devices, each device including a pin springingly mounted in a housing and reciprocally movable between at least two positions, at least one of said positions being with said pin in intersecting relation to the plane of an alignment surface such as the exterior surface of a printing cylinder, each of said pins being received through an accurately positioned aperture in a plate; to provide such an aligning device in an associated position relative to a printing plate cylinder wherein a plate or the like may be mounted to the alignment or exterior surface of the cylinder by placing accurately positioned apertures in said plate over the pins of the aligning devices without the necessity of bending or creasing the plate or the like prior to the placement of the plate on the alignment surface; to provide such an apparatus which may be easily and inexpensively manufactured and installed on existing equipment without extensive modification to said equipment.

This invention contemplates an alignment apparatus comprised of a structure having an alignment or positioning surface disposed in a given plane upon which may be supported in the desired aligned position a particular object such as a printing plate. The invention further contemplates a registering or aligning means operatively associated with said structure including register pins, said pins being operable to move in a direction generally perpendicular to said plane and through said plane between a first and second position with said registering means further including retaining means operatively connected to said register pins to releasably retain said pins at each of said positions where at least one of said positions places each of said register pins in intersecting exteriorly protruding relation to the plane of the positioning surface.

This invention also contemplates a method of accurately positioning an article on an alignment surface which extends in a given plane, said alignment surface having at least two register pins associated therewith. This method includes the steps of forming at least two apertures in said article, moving said register pins to a position in intersecting relation to said plane of the alignment surface, placing said article on said surface with the pins located in said apertures to accurately position said article on said surface, retaining the article in its accurately positioned relation on the alignment surface, and moving said pins to a second position out of intersecting relation to the plane of the alignment surface.

Other objects and advantages of this invention will become apparent from the following description taken in connection with the accompanying drawings where are set forth by way of illustration and example certain embodiments of this invention.

FIG. 1 is a front view of a printing press containing an alignment apparatus embodying the features of this invention.

FIG. 2 is a fragmentary perspective view of a plate cylinder with a printing plate mounted thereon by means of a gripper bar, said plate and said bar being broken away to illustrate the positioning of a register pin assembly on said cylinder and in relation to said gripper bar.

FIG. 3 is a transverse sectional view taken on line 3—3 of FIG. 2 showing the gripper bar retaining the head portion of a printing plate with the printing plate being aligned by means of a register pin assembly.

FIG. 4 is a perspective view of a register pin assembly including a register pin, its housing and retaining bracket.

FIG. 5 is a sectional view taken on line 5—5 through

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FIG. 4 of the register pin, pin housing and bracket of the register pin assembly.

Referring to the drawings in more detail:

The reference numeral 1 broadly designates an alignment apparatus embodying the features of this invention and illustrated herein as a plate mounting cylinder 2 operatively retained in an offset press mechanism 3 in a conventional manner. The alignment apparatus 1 is basically comprised of an alignment or positioning surface 4 and a register pin assembly 5 positioned to co-operate with the alignment or positioning surface 4 to effect the accurate alignment or positioning of a plate, negative or the like upon the positioning surface 4.

In the illustrated embodiment, the positioning surface 4 is illustrated as the exterior surface 6 of a plate mounting portion 7 of the plate cylinder 2 which defines an alignment or positioning surface which extends in a cylindrical plane circumferentially about the plate mounting cylinder 2. The cylindrical portion of the alignment surface 4 is broken at 8 by an inset, cavity or recessed portion illustrated herein as a longitudinally extending pair of grooves 10 and 12 formed in the plate mounting cylinder 2 and defining a mounting plate cylinder cavity 13. As is conventional practice, the means employed to retain a plate 11 in the desired position on cylinder 2 is disposed within the grooves 10 and 12 of cavity 13 in a position inwardly from the cylindrical portion of the exterior surface 6 of the plate mounting cylinder 2 to prevent this portion of the cylinder 2 from contacting the transfer cylinders of the printing press 3 as the plate mounting cylinder is rotated in said press assembly 3. In the illustrated embodiment, each of the longitudinal grooves 10 and 12 are defined by a pair of intersecting angularly disposed walls 14 and 16, the wall 16 being disposed in a generally perpendicular relation in a cylindrical portion of the press cylinder 2 extending inwardly of said portion and defining a gripper edge 18 at the line of intersection between the longitudinally extending wall 16 and the exterior surface 6 of the press cylinder 2. In conventional practice, a lithographic plate is bent in a suitable aligning apparatus forming a crease which extends longitudinally of said plate and the crease is then aligned with the gripper edge 18 to effect an alignment of the plate on the press cylinder 2.

The head portion 20 of the lithographic or printing plate 11 is operatively mounted to the press cylinder 2 by a mounting means disposed within the longitudinal groove 10 and illustrated as being operatively connected to the wall 14 of said groove 10. The mounting means is illustrated as a plate clamp or gripper 22 having a base plate or lower portion 24 which is secured by suitable means to the wall 14 of groove 10 and a plurality of clamp plates 26 releasably retained on the base plate 24 to clampingly engage therebetween the head portion 20 of the lithographic plate 11. The tail portion 28 of the plate 11 is operatively connected to the press cylinder 2 in a manner similar to that discussed in relation to the head portion 20 by means of a similar type mounting means which may be of any conventional nature and has not been shown in the attached drawings to make said drawings more easily understandable.

Referring to FIGS. 4 and 5, an embodiment is illustrated representing one form of a register pin assembly 5, the register pin assembly 5, as illustrated, having a bracket mounting 30 which is disposed in underlying relation to a portion of the plate clamp bar gripper 22 in a recessed area or groove 32 in the base plate 24 of gripper 22. The mounting bracket 30 is operatively connected by a pair of Allen set screws 34 which are threadably engaged in wall 14 of groove 10. The mounting bracket 30 may take various forms and may be mounted in various relations to the plate mounting means and the cylinder press 2 depending upon the structure of the cylinder 2 and said mounting means. The mounting bracket 30 has a pin housing or casing 33 operatively mounted thereon and defining a longitudinal bore 34 for receipt of a movable

register pin 36. The pin 36 is resiliently mounted on a spring 38 which is received in the lower portion 40 of the bore 34 with the pin so arranged such that said pin 36 is operable for longitudinal movement between a first and second position and wherein at least one of said positions places said pin 36 in an intersecting relation to an alignment or positioning surface such as alignment surface 4 of press cylinder 2.

The register pin 36, as illustrated, may be fixed in either of two selected positions by means of a locking mechanism 42 which consists of a locking bar 44 transversely disposed in relation to the register pin 36 in a through bore 46 which extends through the register pin 36. The locking bar 44 extends outwardly from pin 36 having an exterior portion 48 disposed in a locking groove 50 defined in the side edge 52 of housing 32. The locking groove 50 is generally L-shaped defining two laterally offset and vertically or longitudinally spaced abutment surfaces 54 and 56. The abutment surfaces 54 and 56 serve to retain the register pin 36 against the force of the coil spring 38 which tends to drive the register pin 36 in a longitudinal direction through the housing 32. The register pin 36 may be locked in its lowermost position in housing 32 by depressing the head portion 58 of the pin 36 by engaging a suitable tool in a groove 59 in the head portion 58 and rotating the register pin 36 to move the exterior portion 48 of lock bar 44 laterally into abutting engagement with the abutment surface 56, thereby retaining the register pin 36 in a first or depressed position. The register pin 36 may then be moved to its upper or second position by rotating the register pin 36, moving the bar 42 laterally in groove 50 to an underlying position of the abutment surface 54 and releasing force on the register pin 36 to allow the coil spring 38 to move said pin outwardly of housing 32 to a second fixed position.

The lithographic or printing plate 11 has a plurality of apertures 60 formed or punched in an exact position in an aligned manner longitudinally along the head portion 20 through which the register pins 36 are disposed to align the plate 11 on the press cylinder 2. In the illustrated embodiment, two register pins 36 are shown mounted to the press cylinder 2 in longitudinal spaced relation corresponding to the spacing of the apertures 60 in plates 11 such that the pins 36 may be passed through at least two of said apertures 60 in the plate 11. As illustrated in FIG. 3, the register pin 36 in its second or outwardly extending position intersects the portion of the alignment surface 4 of the press cylinder 2 such that the plate 11 can be aligned by passing the pins 36 through the apertures 60 without bending or distorting the shape of said plate 11. The register pin apparatus 5 is positioned adjacent the wall 16 of groove 10 and the gripper edge 18 in such a manner that the pin 36 may be depressed downwardly to a position slightly inwardly from the cylindrical portion of the alignment surface 4 of the press cylinder 2 to prevent the pin head 58 from interfering with the operation of the various contacting rollers within the press apparatus.

In operation, a plurality of plates such as a series of plates to be utilized in an offset color or other printing operations are accurately punched by an apparatus such as a plate punch such as shown in Patent No. 3,196,725 which will accurately position an aligned series of apertures 60 along the head portion 20 of plate 11. As each plate 11 is individually placed upon the press cylinder 2, it is moved into the desired position by passing the register pins 36 through at least two of the aligned apertures 60 with the pin in its outwardly extending or second position intersecting the cylindrical portion of the press cylinder 2. The plate 11 may then be secured in this aligned position in a conventional manner by clamping the head and tail portions 20 and 28 respectively on suitable mounting means. Before the printing operation is commenced, the alignment pin 36 is depressed by engaging a

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suitable tool in the groove 59 of the head portion 58 of the pin 36 and forcing the pin 36 inwardly of the housing 32, then rotating the pin to a position where the locking bar 44 abuts the abutment surface 56, thereby retaining the pin in a depressed position. The depressed or first position of said pin 36 moves the head portion 58 of pin 36 to a position slightly inwardly of the plane of the cylinder 2 such that the pin head 58 will not interfere with the printing operation. Subsequent plates may then be individually placed on the printing press cylinder 2 in exactly the same position as other previous plates by repeating the simple and rapid alignment operation employing the register pin assemblies 5.

I claim:

1. In a printing apparatus, a plate cylinder comprising:
 - (a) an exterior surface having a cylindrical portion for receiving a printing plate and a cavity portion extending inwardly of said cylindrical portion,
 - (b) gripper means on said cylinder for securing a plate in a selected position on the cylinder,
 - (c) mounting means secured to said cylinder and positioned within said cavity portion, said mounting means and gripper means being attached independently of one another to said cylinder,
 - (d) at least two register pin assemblies supported by said mounting means in spaced apart relation axially of the cylinder,
 - (e) a register pin retractively mounted in each pin assembly and extending radially of the cylindrical plate mounting portion of said cylinder, whereby the register pins are movable in a direction radially of the cylindrical mounting portions of the cylinder between at least two spaced positions, at least one of said positions places said register pins in intersecting relation to the cylindrical portion of the cylinder and wherein at least one of said positions places said register pins out of intersecting relation with the plate mounting portion of said cylinder and wherein said mounting means further includes retaining means operatively connected to said register pins to releasably retain said pins in each of said positions, each of said

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pins being adapted to be received through an accurately positioned aperture in said plate.

2. In a printing apparatus, a plate cylinder as recited in claim 1 wherein each of said register pins are operably mounted in a housing, said housing defining a longitudinal bore with said pins slidably mounted within said bore, said housing containing means operatively connected to said pins to retain said pins in at least two longitudinally spaced positions.

3. In a printing apparatus, a press cylinder as recited in claim 2 wherein the means to retain the pin in at least two longitudinally spaced positions is comprised of a pair of longitudinally spaced laterally offset abutment surfaces on said housing and a lock bar operatively connected to the register pin, said bar having a portion engageable with said abutment surfaces to retain said register pin in a releasably retained position, said pin being rotatable to disengage said lock bar from said abutment surfaces.

4. In a printing apparatus, a plate cylinder as recited in claim 3 wherein said bore has a lower portion with a spring means disposed in said portion and operatively connected to said register pin to apply an outwardly directed force tending to move said pin outwardly of said bore and wherein said lock bar in cooperation with said abutment surfaces retains said pin in said bore.

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