

March 31, 1953

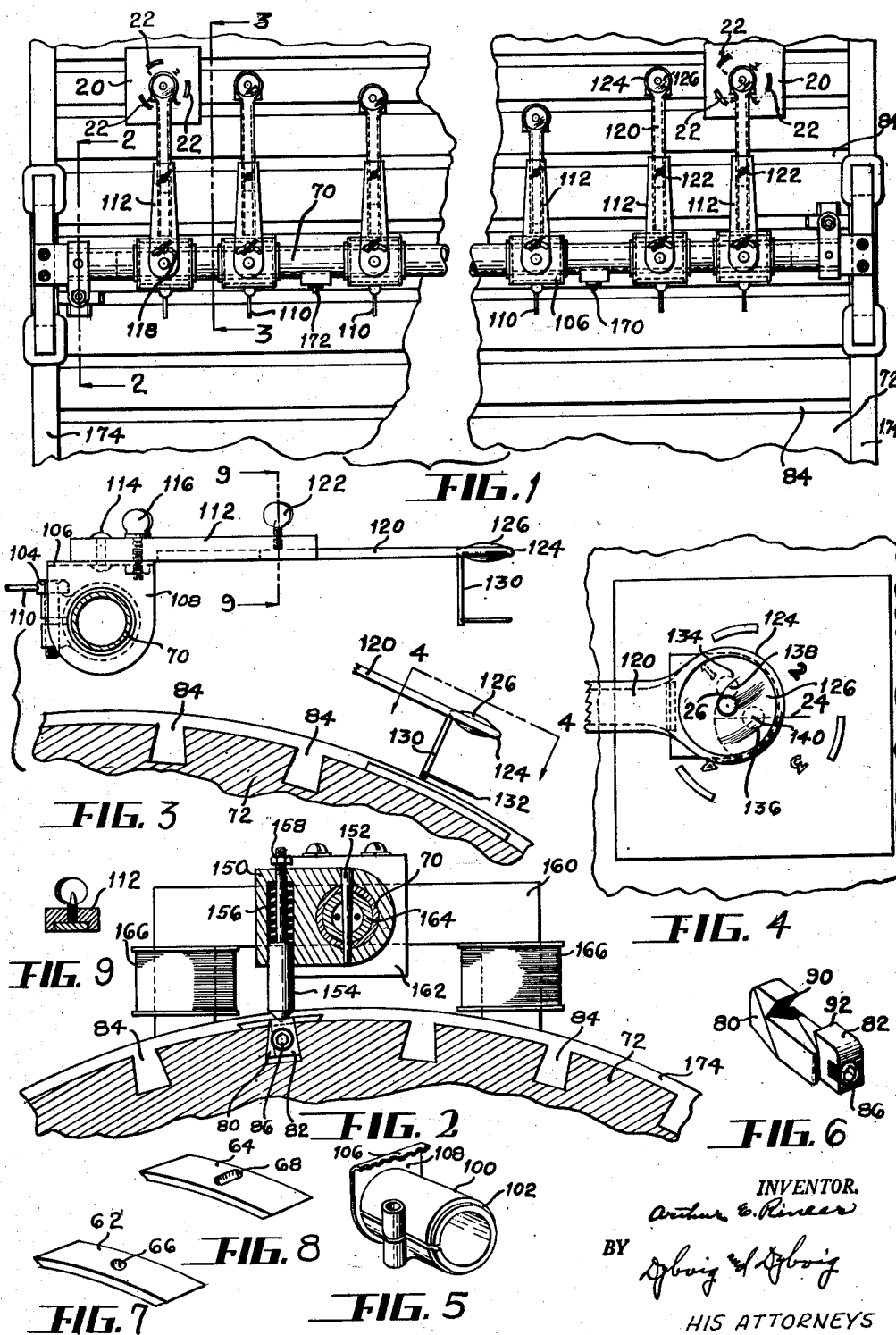
A. E. RINEER

2,633,076

PLATE ALIGNING ATTACHMENT

Filed May 5, 1949

2 SHEETS—SHEET 1



INVENTOR.
Arthur E. Rineer
 BY *Sping & Sping*
 HIS ATTORNEYS

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A. E. RINEER

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2 SHEETS—SHEET 2

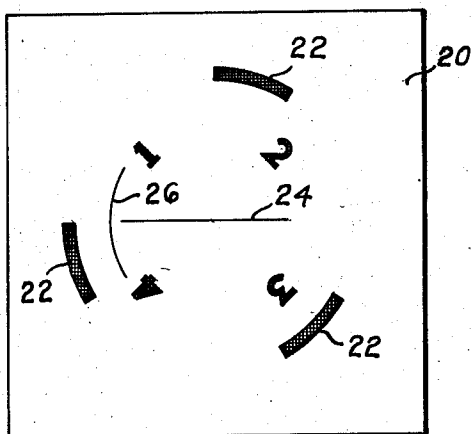


FIG. 11

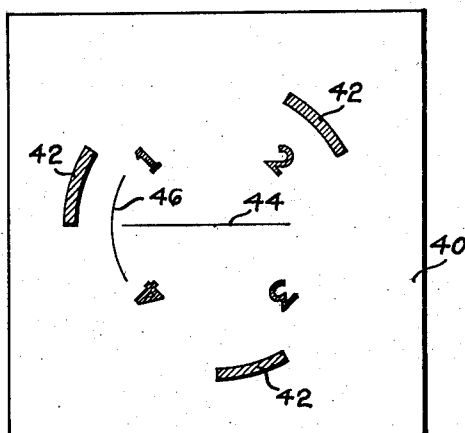


FIG. 13

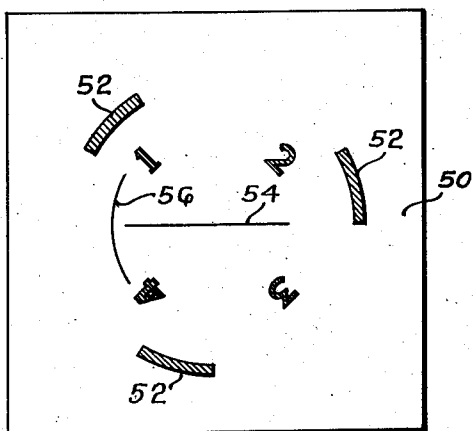


FIG. 14

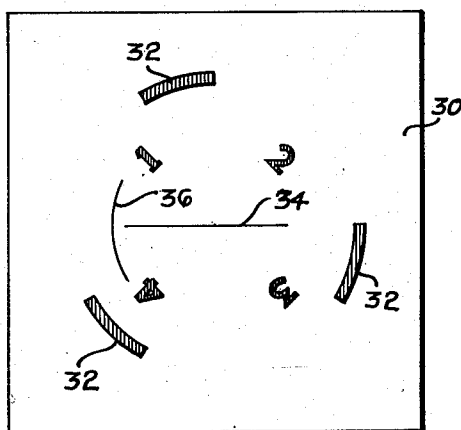


FIG. 12

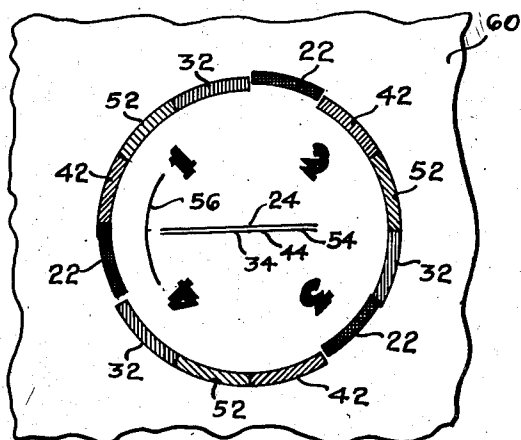


FIG. 15

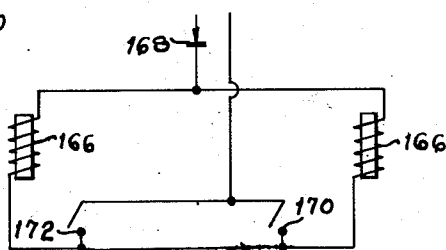


FIG. 10

INVENTOR.
A. E. RINEER
BY *Dybing & Dybing*
HIS ATTORNEYS

UNITED STATES PATENT OFFICE

2,633,076

PLATE ALIGNING ATTACHMENT

Arthur E. Rineer, Centerville, Ohio, assignor of
one-half to Rudolph Platzter, Dayton, Ohio

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12 Claims. (Cl. 101—183)

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This invention relates to a plate-aligning attachment for use on various types of printing presses.

An object of this invention is to provide a removably mounted attachment for printing presses that is adapted to be attached to each of the printing cylinders on a multicolor press in serialim.

Another object of this invention is to provide a plate aligning bar that may be accurately positioned on the printing cylinder and held in position magnetically, the bar having a plurality of adjustable arms having indicia for use in aligning marks, indicia or points on a printing plate in such a manner that when the bar has been moved from one cylinder to another and the printing plates locked in position, the plates are in proper registry when the printing press is operating at normal speed.

Another object of this invention is to provide a plurality of buttons on each of the cylinders for use in properly positioning the aligning bar, the buttons upon being adjusted into proper position being permanently secured in position. The retaining means for the buttons may be seated in dovetailed grooves in the printing cylinder, although not necessarily so limited, in that the aligning buttons may be secured in position in any suitable location on the cylinder, the method and means of securing the buttons in position depending upon the type of cylinders used on the printing press.

Another object of this invention is to provide a lens system, whereby indicia on the plate to be positioned are magnified so as to accurately align the indicia and the printing plate with fixed indicia adjustably mounted on arms held in a selected position.

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.

The device disclosed herein consists of a plurality of buttons fixedly mounted in a predetermined position on each of the printing cylinders of a multicolor press, these buttons being used to align a plate aligning bar that is locked or held in position when properly aligned by suitable retaining means, such as electromagnets, the aligning bar supporting a plurality of arms each adjustably carrying plate aligning indicia for use in properly positioning the plates on the several printing cylinders of a multicolor press, so that when the plates have been properly locked

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in registry on the several cylinders, the impressions of the several plates are superimposed upon each other in proper registry when the printing press is operating at normal or full speed.

For some reason, if the plates are locked in position so that the plates on the several cylinders of a multicolor press appear to be in registry when the cylinders are rotated by hand for test purposes, the plates usually are not in registry when operating at full speed, possibly due to backlash, torsional forces and possible tensile forces causing the driving mechanism to force the cylinders out of registry. That being the case, it has been found necessary to devise a method of positioning the buttons such that they are in registry when the printing press operates at normal operating speed. The buttons are secured in position by a pair of wedge members that may be mounted in the dovetailed slot normally found in printing cylinders and locked in position by an adjusting screw. These two wedging members cooperate to form a channel, adapted to receive a dovetailed shaped button, so that the button may be adjusted in a direction normal to the longitudinal axis of the dovetailed slot in the cylinder. This permits adjustment of the button axially with respect to the cylinder and circumferentially with respect to the cylinder, as will appear more fully later.

Referring to the drawings,

Figure 1 is a fragmentary top plan view of an aligning bar mounted upon the cylinder.

Figure 2 is a fragmentary, cross sectional view taken substantially on the line 2—2 of Figure 1.

Figure 3 is a cross sectional view taken substantially on the line 3—3 of Figure 1, without disclosing the printing cylinder and the printing plate.

Figure 4 is an enlarged, fragmentary top plan view of the aligning mechanism and the printing plate, as viewed in the direction of the arrows 4—4 in Figure 3.

Figure 5 is a fragmentary, perspective view of the bearing member or split collar used in securing the aligning arms in position.

Figure 6 discloses a perspective view of a pair of wedge-shaped members used in locking the button in position.

Figure 7 is a perspective view of one of the buttons.

Figure 8 discloses another button used on the opposite end of the printing cylinder.

Figure 9 is a cross sectional view taken substantially on the line 9—9 of Figure 3.

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Figure 10 is a schematic wiring diagram of the electrical circuit showing the electromagnets schematically.

Figure 11 discloses a printing plate used on a black cylinder.

Figure 12 discloses a printing plate used on a red cylinder.

Figure 13 discloses a printing plate used on a blue cylinder.

Figure 14 discloses a printing plate used on a yellow cylinder.

Figure 15 discloses the impressions produced by the four cylinders.

When equipping a printing press for the use of aligning bars, it is first necessary to accurately locate aligning buttons fixedly secured to the printing cylinders. The aligning bar is so designed that as soon as one plate has been placed on one cylinder, as for example, the black plate on the black cylinder, the aligning bar has its indicia placed in registry with indicia marks on the black printing plate. When this has been done and the black plate has been secured in position, the aligning bar is moved to another cylinder, as for example, the red cylinder, so as to position the red printing plate. The red printing plate is provided with registry marks corresponding to the registry marks on the black printing plate. The registry marks on the red printing plate are then adjusted into registry with the indicia on the aligning bar. When the red printing plate has been locked in position in registry, the aligning bar is placed on another cylinder, as for example, the blue cylinder, and the operation repeated. These operations are repeated until all of the cylinders have one set of plates locked in position. Usually, there are three, four or five rows of plates on each cylinder. If, for example, there are four circumferentially disposed rows of plates aligned across the cylinder, four pairs of buttons are used for each printing cylinder, one for each row of plates.

Various methods may be used for properly locating the buttons that are to be fixedly secured to the printing cylinder. In the embodiment shown herein, this method includes the use of one pair of identical printing plates for each of the printing cylinders, that is, one pair of black plates, one pair of red plates, one pair of yellow plates and one pair of blue plates, in the event a four color printing press is used for printing black, red, yellow and blue. The colors have been selected merely for the purpose of illustration. Any number of colors and any combination of colors may be used, for example, at the present time eight color printing presses are in use in some of the larger printing establishments. Then there are eight printing cylinders requiring eight sets of buttons. These pairs of plates made for aligning purposes are much smaller than regular printing plates, so that there is practically no discrepancy caused by curving the plates—the larger the plate, the greater the possibility of distortion caused by the curving operation and in manufacturing the plate.

Referring to the drawings, the reference character 20 indicates a black printing plate that may be used for properly positioning the buttons. This printing plate is provided with three black printing areas or arcuate segments 22, arcuate in shape and equi-angularly spaced with respect to a common radius of curvature center. Four numerals 1, 2, 3 and 4 are equi-angularly positioned with respect to a common center. In addition thereto, there is a horizontal line 24 and a curved

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or arcuate line 26. Two of these plates, identical in shape, are used on the black cylinder, as clearly shown in Figure 1, one adjacent each end of the cylinder. There are two red plates 30, each provided with arcuate segments 32, numerals 1, 2, 3 and 4, a straight line 34 and an arcuate line 36. It is to be noted that the arcuate segments 32 are equi-angularly positioned with respect to a common center; but these segments are offset with respect to the segments 22. Upon the blue cylinder a pair of plates 40 are used, each provided with arcuate segments 42, the numerals 1, 2, 3 and 4, a straight line 44 and an arcuate line 46. The yellow cylinder has mounted thereon a pair of plates 50 provided with arcuate printing segments 52, the numerals 1, 2, 3 and 4, a straight line 54 and an arcuate line 56.

These plates are mounted on the respective cylinders and upon being properly aligned, a proof or impression is printed on a sheet of paper 60. This impression is pulled when the cylinders are rotating at the usual operative or running speed. If all of the plates are properly positioned, the lines 24, 34, 44 and 54 will be in perfect registry and arcuate lines 26, 36, 46 and 56 will be in perfect registry. For purposes of illustration, the black plate 20 is not in perfect registry, as clearly shown in Figure 15, in that the arcuate segments 22 are a little too high and the horizontal line 24 is out of registry with the lines 34, 44 and 54. That being the case, it will be necessary to lower the black plate 20. The service man observes that the plate is too high above the numerals 1 and 2. He then taps the black plate in the direction of the numerals 1 and 2 until he gets it in proper registry. When all of the plates are in proper registry, the horizontal lines 24, 34, 44 and 54 are preferably in alignment. The arcuate lines 26, 36, 46 and 56 are in perfect registry and form a closed circle. The plates are adjusted, so that at running speed a perfect circle is printed on the paper.

When this has been done, the service man is ready to locate the aligning buttons 62 and 64. Each of the buttons 62 is provided with a semi-spherical recess 66. Each of the buttons 64 is provided with an oblong recess or slot 68. The buttons 62 are located on one side of each printing cylinder and the buttons 64 are located on the opposite side of the printing cylinders. The semi-spherical recess 66 accurately positions one end of an aligning bar 70 both axially and peripherally. The buttons 64 align the other end of the aligning bar peripherally. The slot 68 is elongated, so that in the event there is unequal expansion or contraction of the bar 70 with respect to the printing cylinder 72, the slots will align the bar peripherally. Axially the bar is fixed by the recess 66. It can readily be seen that the temperature of the printing cylinder and the temperature of the aligning bar may not always be the same. The printing cylinder may have been used for a period of time sufficient for a considerable amount of heat to be generated therein, especially in the event the press is provided with heating elements or gas flames for drying the ink. The longitudinal recess or slot 68 adequately takes care of unequal contraction and expansion between the bar and the several printing cylinders.

It is to be noted that the buttons 62 and 64 have a curvature corresponding to the curvature of the printing cylinder. Furthermore, the lateral edges of the buttons 62 and 64 are bevelled, so that the buttons have a dovetailed cross sectional area.

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A pair of wedging or wedge-shaped members 80 and 82 are adapted to be seated in transversely or axially disposed dovetailed slots 84 arranged throughout the periphery of the cylinder 72. In the event some other type of slot or groove is used, suitable attaching means are provided. The wedging members 80 and 82 are provided with an aperture receiving a threaded screw 86 threadedly engaging threads in member 80. The aperture in member 82 does not have threads. The taper of the wedge-shaped member 80 is directed in a direction opposite to the taper of the wedge-shaped member 82, so that when the wedge-shaped members are actuated towards each other they expand in overall width. Members 80 and 82 are provided with projections or extensions forming shoulders 90 and 92, cooperating to form a dovetailed slot that is arranged at right angles to the selected slot 84 in the cylinder 72. The wedge-shaped members 80 and 82 may be adjusted axially in the slot 84 before the screw 86 is tightened. Furthermore, the button 62 or 64 may be adjusted peripherally when placed in the dovetailed slot formed between the shoulders 90 and 92 of the wedge-shaped members 80 and 82 respectively. The aligning bar assembly will now be described.

The bar 70 supports a plurality of split sleeves 100, each provided with a rabbet 102 on either end. These split sleeves 100, as best seen in Figure 3, are clamped upon the bar 70 by means of screws 104. By loosening the screws 104, the sleeves 100 may be adjusted axially on the bar 70. When adjusted to the proper position, the sleeves are clamped into position by tightening the screws 104. Each sleeve 100 supports a U-shaped clevis-like member 106 having legs 108, one adjacent each end of the tubular sleeve 100. The legs 108 are provided with an aperture seated in the rabbet 102. The U-shaped clevis-like members 106 are rotatably mounted on the tubular split sleeves 100 without being mounted for axial movement. A rearwardly projecting pin 110 is seated in a selected aperture in the head of the screw 104 for use in tightening the screw to secure the split sleeve 100 in adjusted position. At times, it may be desirable to adjust the split sleeve 100 axially on the bar 70. If so, the pin or wrench 110 is actuated to loosen the screw 104, to thereby permit adjustment of the sleeve 100 and the parts carried thereby.

A plurality of arm members 112, one for each of the U-shaped clevis-like members 106, are mounted upon pivots 114 supported upon the U-shaped clevis members 106, the pivot permitting rotary movement or adjustment of the arms 112 with respect to the clevis-like members 106. Each of these arm members 112 may be locked in adjusted position by a screw 116 positioned in the slot 118 in the arm member 112.

As may best be seen by referring to Figure 9, the arm member 112 is provided with longitudinally extending dovetail slots receiving a second arm member 120. This arm member 120 may be adjusted longitudinally in the slots in the under side of arm member 112 and secured in any adjusted position by a set screw 122. The outer end of the arm member 120 is provided with an annular lens-supporting ring 124 used in supporting a magnifying lens 126. The arm member 120, as best seen in Figures 3 and 4, supports a downwardly directed bracket 130 used in supporting a transparent member 132 that has etched therein a pair of rings 134 and 136, each encircling centers 138 and 140 respectively. The

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arm member located to the extreme right of the bar 70, as viewed in Figure 1, and the arm member located to the extreme left of the bar 70 in the same figure, are preferably accurately adjusted to the same length. Furthermore, the angular direction of these two bars is so adjusted that the centers 140 are aligned with the hair lines 24 on the plates 20, one on either end of the cylinder. The bar 70 has been provided with aligning means adjacent each end thereof, adapted to register with the recesses 66 and 68 in the buttons, which aligning means will now be described.

As may best be seen by referring to Figure 2, the bar 70 supports a D-shaped block 150 keyed to the bar 70 by a key or pin 152. The blocks 150 each support a spring-urged pin 154 provided with a semi-spherical end and urged downwardly by a compression spring 156. A nut 158, threadedly engaging the reduced end of the pin 154, prevents the pin from dropping out of the block 150 whenever the bar 70 is transported from one cylinder to another and whenever the bar is not in use.

A plurality of U-shaped laminations 160 are fixedly attached to a suitable metallic block 162 provided with a tubular extension 164 projecting into the end of the bar 70 and held in position by the key or pin 152. The legs of the laminations 160 are provided with coils 166 energized from a suitable source of alternating current through a rectifier 168, shown in Figure 10. The laminations 160, cooperating with the coils 166, form an electromagnet aligned with the bearer 174 on the end of the printing cylinder, to clamp the bar 70 in a fixed position on the cylinder. A pair of switches 170 and 172 are used to energize the electromagnet. These switches are preferably mounted in any suitable manner on the bar 70. There is mounted on each end of the bar 70 one set of electromagnets and one set of blocks 150, together with the parts associated therewith. The lines to the coils 166 are preferably provided with a suitable plug having a pair of prongs adapted for use with any conventional 110 volt A. C. outlet socket.

Upon the two arms located on opposite ends of the bar 70 being adjusted to the same length, the arms are adjusted into such a position, together with the bar 70, that the center 140 is aligned with the straight hair line 24 and the center 138 lies on the arcuate curve or line 26. The switches 170 and 172 are closed, so as to cause the electromagnets to fixedly hold the bar 70 in a fixed position with respect to the cylinder and the two plates that have previously been mounted on the cylinder. The buttons 62 and 64, one on either end, are then adjusted axially by moving the wedge-shaped members 80 and 82 in the slot of the cylinder, so that the recesses 66 and 68 are aligned with the semi-spherical points on the ends of the pins 154. The two buttons 62 and 64 are adjusted peripherally until the pointed end of each of the pins 154 is accurately centered in the recesses 66 and 68. When this has been done, the screws 86 are tightened, so as to lock the buttons 62 and 64 in fixed position on the cylinder, with the centers of the pins 154 in registry with the centers of the recesses 66 and 68.

When the buttons have been secured in position for the first cylinder, generally referred to as a black cylinder, in that it is customary to first align the black plates, the switches 170 and 172 are opened, so as to release the bar 70.

The bar is then transferred to one of the other cylinders, as for example to the cylinder supporting the red plates 30 that have previously been clamped in position on the red cylinder in such a manner that when the press operates at regular operative speed, the impressions of the black cylinder and the red cylinder properly register, is previously described. The bar 70, upon being moved to the new cylinder, is adjusted into a position such that the centers 138 and 140 register with the arcuate line 36 and the straight line 34 respectively. When the arms on the two opposite ends of the cylinder properly register with the plate, the switches 170 and 172 are again closed, so as to lock the bar in position on the cylinder. Prior to the bar 70 being transferred to the red cylinder, a pair of wedges 80 and 82 have been inserted into an appropriate slot, there being one pair of wedges for each end of the slot and a pair of buttons 62 and 64 have been loosely positioned in the dovetailed grooves formed by the wedges. The wedges and buttons are adjusted into position such that the recesses 66 and 68 are centered with respect to the points on the pins 154. It is preferable to recheck the registry of the centers 138 and 140 with the arcuate line 36 and the straight line 34 respectively, to assure proper location of the buttons 62 and 64. Upon the buttons being properly positioned, the screws 86 are tightened, so as to lock the buttons on the red cylinder. The same procedure is followed with each of the other cylinders, so as to position a pair of buttons for each cylinder.

The process described thus far adequately takes care of one row of plates on each of the printing cylinders. The printing cylinders are provided with a plurality of rows of plates. There may be three, four or five rows, depending entirely upon the size of the cylinder and the size of the signatures printed upon the cylinder. The process of locating the buttons for each of the additional rows of plates is the same as that already described, the operation being repeated until all of the rows have been provided with aligning buttons.

After the buttons have all been locked in position, this being accomplished, as already described, by tightening the screw 86, the buttons remain in the locked position thereafter. The aligning plates disclosed in Figures 11 to 14 inclusive are then all removed and the printing press is ready for the mounting of regular printing plates. Usually, there are a number of plates in each row. Each plate is provided with two sets of indicia, one adjacent each lateral margin of the plate or electrotype. These indicia are preferably placed near the peripheral center of the plate, so that the distortion of the plates upon being curved is limited to half the plate in each direction. By placing the indicia near the center of the plate, the center of the impressions can be accurately aligned, the distortion being located near the ends of the plates.

A row of black plates is aligned across the cylinder and clamped in position. The bar 70 is then placed on the black cylinder adjacent the row. The switches 170 and 172 are closed after the pins 154 have been seated and brought into proper registry with the recesses 66 and 68, so as to lock the bar in position. A pair of arms is then adjusted in length and angularly so as to cause the centers 138 and 140 to register with the indicia on a black plate, there being a pair of arms for each of the plates in one row on

the cylinder. After the pairs of arms have been adjusted so that the centers 138 and 140 of each pair register with the proper indicia, the switches 170 and 172 are opened, and the bar is then transferred to the buttons for the corresponding row on one of the other cylinders, as for example, on the red cylinder. The arms may be rotated about the bar 70 so as to be lifted out of the way for the insertion of the plates to be used in the corresponding row. The plates are positioned in the approximate position, the arms being rotated so as to overlie the plates. Each plate is then adjusted so as to cause the indicia to be in registry with the centers 138 and 140. As soon as the plates are adjusted into proper registry, the plates are clamped in position. The switches 170 and 172 are then opened so as to release the electromagnets and the bar transferred to a corresponding row on another cylinder, the operation being repeated on this cylinder, so as to position a row of plates thereon.

The same operation is repeated until all of the cylinders have mounted thereon a row of plates. The operation is then continued for a succeeding row on each of the cylinders until all of the electrotypes or printing plates are locked in position.

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. In combination with a multicolor press having a plurality of printing cylinders, each adapted to support printing plates, a plate-aligning assembly including a plurality of pairs of buttons adjustably and fixedly clamped to the cylinders, there being one pair for each row of plates on each cylinder, a transverse bar, means on the transverse bar adapted for registry with any selected pair of buttons, means for holding the bar in position when the bar has been properly aligned with said pair of buttons, and a plurality of adjustable extensions on the bar, said extensions being provided with indicia adapted for alignment with predetermined marks on the plate to be aligned.

2. In combination with a multicolor press having a plurality of grooved printing cylinders each adapted to support printing plates, a plate-aligning assembly including a plurality of pairs of buttons, there being one pair of buttons for each row of plates on each cylinder, means for securing the buttons to the cylinder, said means including a pair of wedge-shaped members located side by side but tapering in opposite directions, means for adjusting the wedge-shaped members axially with respect to each other to clamp the wedge-shaped members in position in the groove in the cylinder, said wedge-shaped members cooperating to provide clamping means adapted to engage a button so that as the wedge-shaped members are adjusted axially the button is clamped in position, and a plate-aligning bar assembly provided with means for registering with a selected pair of buttons, said plate-aligning bar assembly being used in aligning the printing plates on the cylinder.

3. In a multicolor press having a plurality of grooved printing cylinders, each adapted to sup-

port printing plates, the combination including a pair of wedge-shaped members positioned side by side with the taper of one wedge-shaped member being directed in a direction opposite to the taper of the other wedge-shaped member, means for adjusting the wedge-shaped members axially so that as the wedge-shaped members are actuated towards each other the wedge-shaped members are clamped in position in a selected groove, said wedge-shaped members being provided with projections projecting outwardly beyond the groove, said projections cooperating to form a dovetail-shaped channel, and a button having a dovetailed cross sectional area positioned in the dovetailed channel formed by the projections.

4. In a multicolor press having a plurality of dovetail-grooved printing cylinders, each adapted to support printing plates, the combination including a pair of wedge-shaped members positioned side by side with the taper of one wedge-shaped member being directed in a direction opposite to the taper of the other wedge-shaped member, the wedge-shaped members cooperating to form a cross sectional area dovetailed in shape and adapted to be seated in a selected dovetailed groove of a printing cylinder, means for adjusting the wedge-shaped members axially so that as the wedge-shaped members are actuated towards each other the overall width of the wedge-shaped members is expanded to thereby clamp the wedge-shaped members in position in the selected groove, said wedge-shaped members being provided with projections having shoulders cooperating to form a dovetail-shaped channel, and a dovetail-shaped button positioned in the dovetail-shaped channel and clamped therein when the wedge-shaped members are adjusted axially.

5. In a multicolor press having a plurality of printing cylinders, each adapted to support printing plates, the combination including a pair of arcuate buttons, the curvature of the arcuate buttons corresponding to the curvature of each printing cylinder, means for securing one button to one end of the cylinder, and means for securing the other button to the other end of the cylinder, one of said buttons being provided with an annular recess and the other button being provided with an elongated recess aligned with the annular recess in the one button.

6. In a multicolor printing press having a plurality of printing cylinders, each adapted to support printing plates, a plate-aligning bar assembly including pairs of aligning buttons secured to each of the cylinders, an aligning bar, means on the aligning bar registering with any selected pair of buttons, and electromagnetic means carried by said aligning bar, said electromagnetic means holding the aligning bar in position and in registry with said pair of buttons.

7. In a multicolor printing press having a plurality of printing cylinders, each adapted to support printing plates, a plate-aligning bar assembly including a plurality of pairs of aligning buttons fixedly mounted on the printing cylinders, an aligning bar removably mounted on each of the cylinders in seriatim, means on the aligning bar registering with any selected pair of buttons, a pair of electromagnets one for each end of the aligning bar, and means for connecting the electromagnets into an electric circuit, said means including a switch, the electromagnets holding the aligning bar in registry with the selected pair of buttons upon the switch being closed to fixedly hold the aligning bar in registry with the selected

pair of buttons while securing the plates in position.

8. In a multicolor printing press having a plurality of printing cylinders, each adapted to support printing plates, a plate-aligning bar assembly including a plurality of pairs of aligning buttons fixedly mounted on the printing cylinders, an aligning bar removably mounted on each of the cylinders in seriatim, means on the aligning bar registering with any selected pair of buttons, a pair of electromagnets one for each end of the aligning bar, circuit means for plugging the electromagnets into an electric circuit, and switch means fixedly mounted upon the aligning bar for closing the circuit through the electromagnets so as to hold the aligning bar in registry with the selected pair of aligning buttons.

9. In a multicolor printing press having a plurality of printing cylinders, each adapted to support printing plates, a plate-aligning bar assembly including a plurality of pairs of aligning buttons fixedly mounted on the printing cylinders, an aligning bar removably mounted on each of the cylinders in seriatim, means on the aligning bar registering with any selected pair of buttons, a pair of electromagnets one for each end of the aligning bar, and electric circuit means adapted to be plugged into an alternating current electric circuit for energizing said electromagnets, said electric circuit means including a rectifier for rectifying the alternating current, and switch means for closing the circuit through the rectifier and through the electromagnets so as to hold the aligning bar in registry with the selected pair of aligning buttons.

10. In a multicolor printing press having a plurality of printing cylinders, each adapted to support printing plates, a plate-aligning bar assembly including a plurality of pairs of aligning buttons fixedly mounted on the printing cylinders, an aligning bar removably mounted on each of the cylinders in seriatim, means on the aligning bar registering with any selected pair of buttons, a pair of electromagnets, one for each end of the aligning bar, for holding the aligning bar in registry with the selected pair of aligning buttons, and electric circuit means adapted to be plugged into an alternating current electric circuit for energizing said electromagnets, said electric circuit means including a rectifier for rectifying alternating current.

11. In a plate-aligning bar assembly for use in aligning printing plates on the cylinders of a multicolor press, the printing plates being provided with aligning indicia, the combination including an aligning bar, means for mounting the aligning bar in a predetermined position upon each of the cylinders in seriatim, a plurality of arms rotatably mounted upon the aligning bar, a plurality of magnifying lenses one for each of the arms, means for fixedly mounting the lenses upon the ends of the arms, and transparent means provided with indicia mounted between the magnifying lens and the indicia on the plates to be aligned for use in adjusting the plates into registry on the cylinders, each of said transparent means being mounted in fixed relation with respect to the ends of the respective arms.

12. In a plate-aligning bar assembly for use in aligning printing plates on the cylinders of a multicolor press, the printing plates being provided with aligning indicia, the combination including an aligning bar, means for mounting the aligning bar in a predetermined position upon each of the cylinders in seriatim, a plurality of

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arms rotatably mounted upon the aligning bar, each of the arms consisting of two parts longitudinally adjustable to permit adjustment of the length of the arms, and indicia means mounted at the outer end of each arm, said indicia means being used in adjusting the plates into registry upon the cylinder by causing the indicia on the printing plates to register with the indicia means on the arms.

ARTHUR E. RINEER. 10

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