March 18, 1947. W. C. HUEBNER 2,417,496

PREDETERMINED REGISTER DEVICE FOR PRINTING ELEMENTS AND THE LIKE

Filed Aug. 22, 1944 4 Sheets-Sheet 1

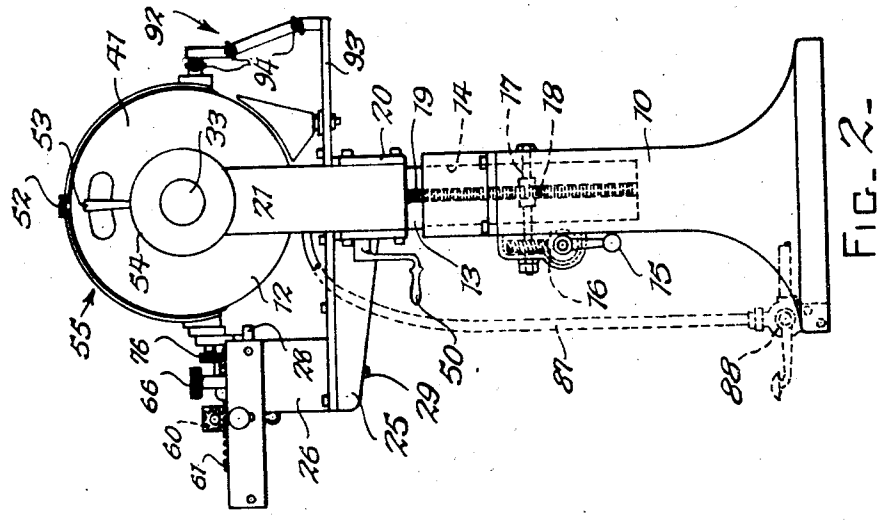


FIG. 2.

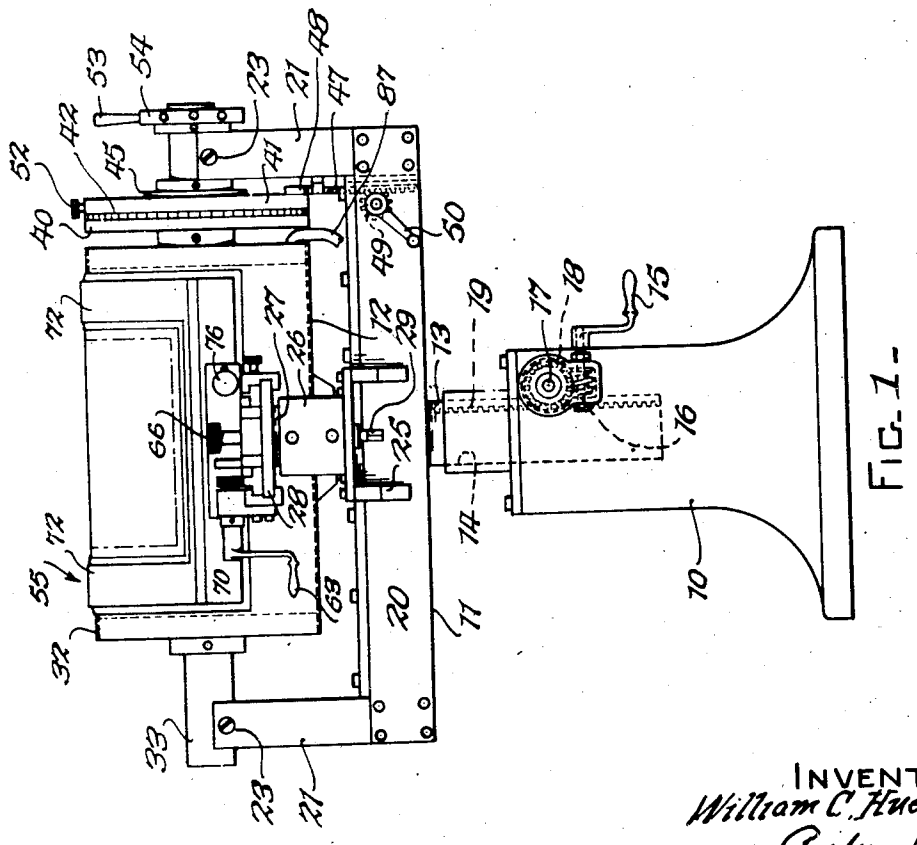


FIG. 1.

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PREDETERMINED REGISTER DEVICE FOR PRINTING ELEMENTS AND THE LIKE

Filed Aug. 22, 1944 4 Sheets-Sheet 3

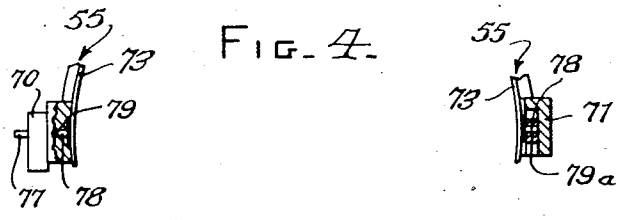


FIG. 4.

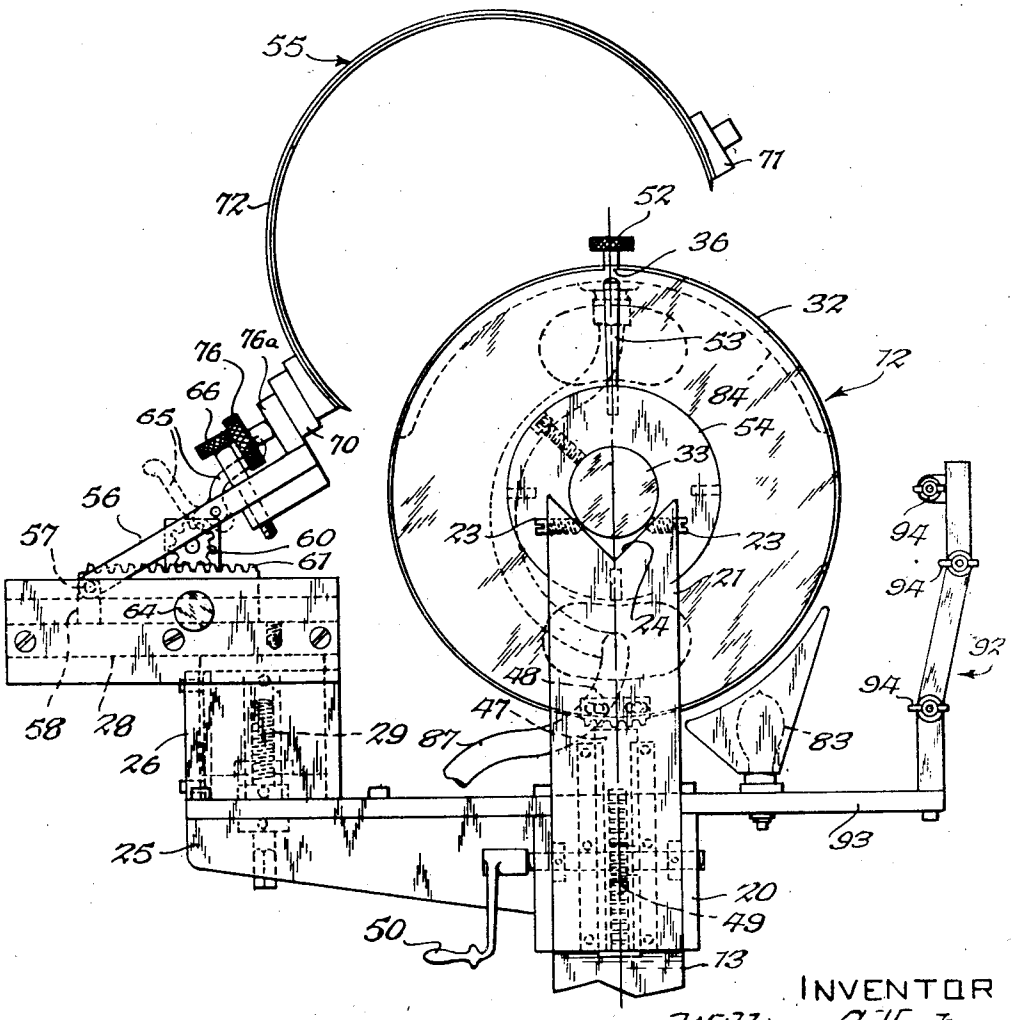


FIG. 3.

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PREDETERMINED REGISTER DEVICE FOR PRINTING ELEMENTS AND THE LIKE

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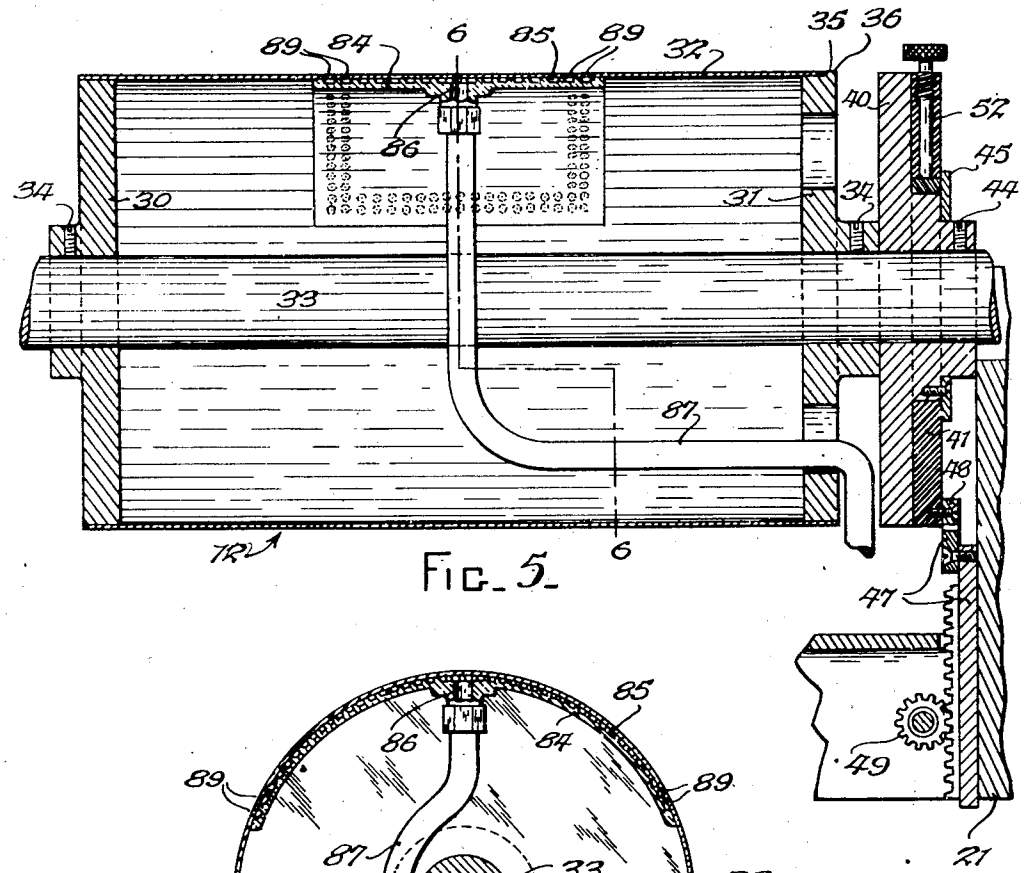


FIG. 5.

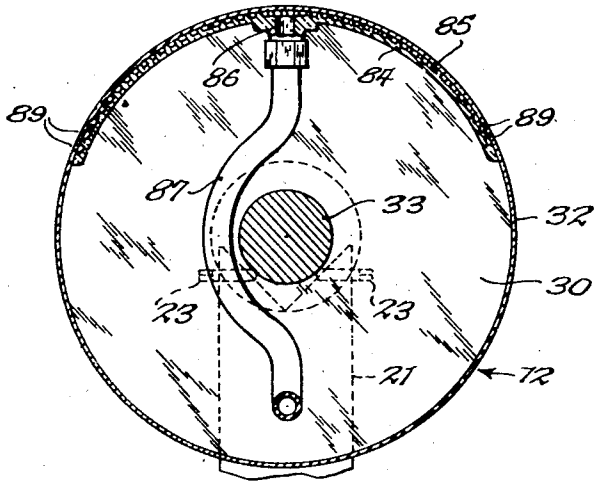
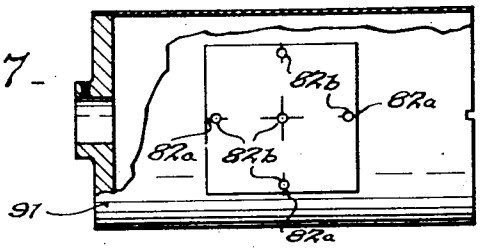


FIG. 6.

FIG. 7.



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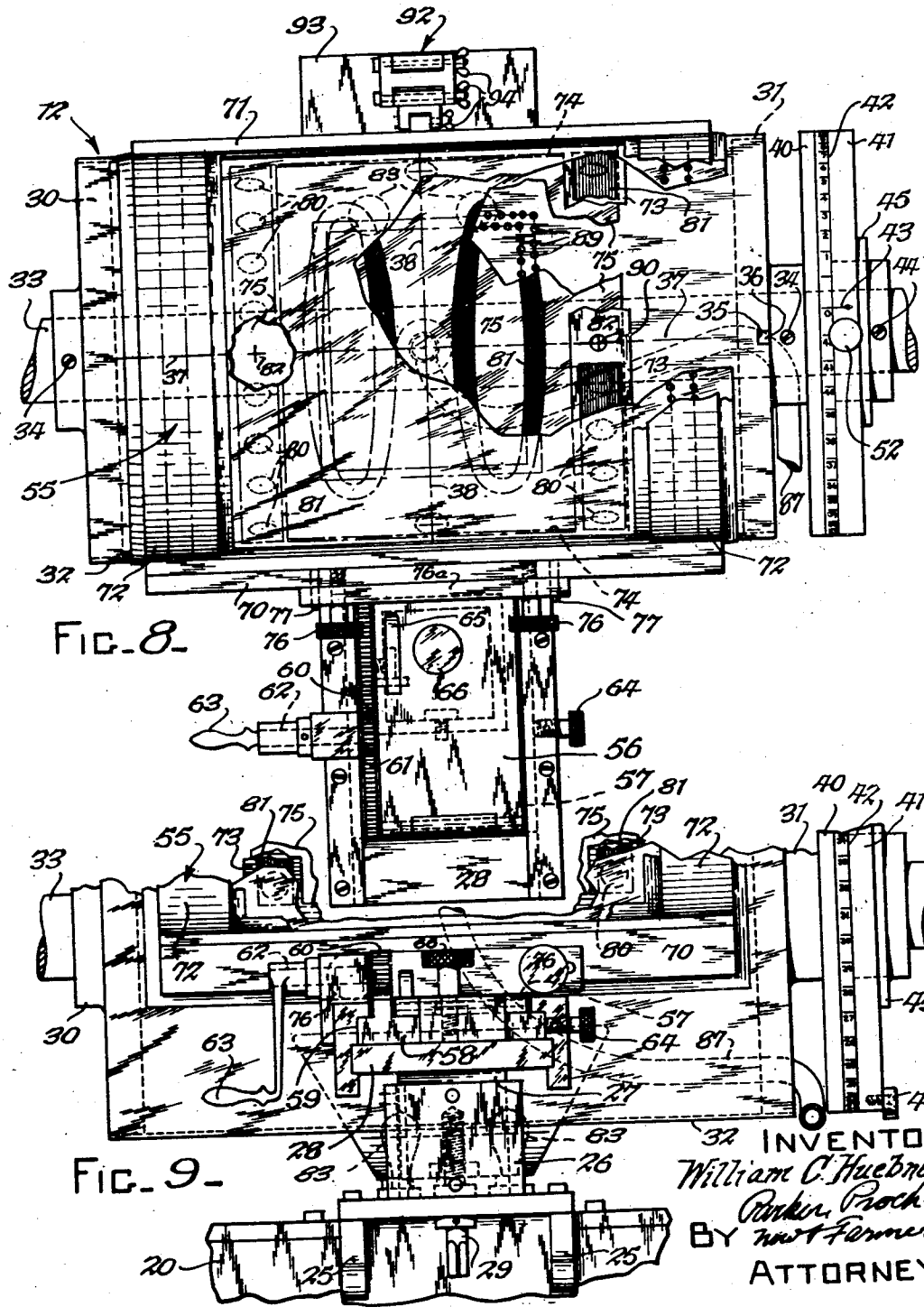


FIG. 8.

FIG. 9.

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Patented Mar. 18, 1947 2,417,496

UNITED STATES PATENT OFFICE

2,417,496

PREDETERMINED REGISTER DEVICE FOR PRINTING ELEMENTS AND THE LIKE

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Application August 22, 1944, Serial No. 550,564

16 Claims. (Cl. 33—184.5)

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This invention relates to registering devices for predetermining the positions of printing elements, such as film negatives or positives and printing plates of metal or analogous sheet material on cylinders, and more particularly to improvements in means or devices for preparatorily registering or predetermining accurately, the positions in which such printing elements are to be mounted upon the cylinders of printing machines or presses.

Among the purposes of the invention, it is intended to provide means, whereby printing plates which are to be mounted in prescribed positions upon the cylinders of electronographic or other printing presses or machines can be expeditiously and with facility registered or positioned independently of, or outside of the printing machine before being mounted in the latter, so that they will be properly located in the prescribed or predetermined positions when put in place for use in the printing machine without then having to adjust or register them; and also by which the positions of films to be used in making photographic contact prints on the sensitized surfaces of printing cylinders can be readily predetermined with accuracy, and a close uniform contact be obtained between the faces of the films that carry the work or image areas and the sensitized surface by vacuum pressure or other means, so as to prevent light rays from undercutting the work areas, and thereby insure the production of high grade sharp images suitable for development and etching, as needed, for example, in the preparation of the cylinder for performing intaglio printing. When printing plates are to be mounted on the printing cylinders, they can be flexible or resilient plates of sheet material which will readily conform to the peripheral curvature of the cylinders and the backs of the plates can be cemented to the surfaces of the cylinders with the printing surface of the plates facing outwardly so that they can be inked and prints made therefrom.

As thus indicated, the registering device of this application has two distinct uses, and will function equally well for securing predetermined register, either of printing plates in cylinder printing presses, or of films in contact photographic printing machines.

One object of my invention is to provide a practical and desirable registering device of the nature indicated, which is of novel construction, and by which the above mentioned purposes can be obtained readily and efficiently.

Another object of the invention is to adapt the

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registering device for the ready positional predetermination of printing plates or films for use on cylinders of different diameters.

The registering device comprises a registering cylinder or curved registering surface on which the printing element is registered in the required or predetermined position, and a removable, curved holder bearing a definite known positional relation to said registering cylinder or surface, on which the printing element is secured, while retained in the registered position, and which holder serves to transfer the printing element, thus registered, to and mount it in the prescribed position on the printing cylinder. Since registering cylinders or surfaces of different diameters or curvatures are used for registering the printing elements for use on printing cylinders of correspondingly different diameters, and since the removable holder for the printing element should correspond substantially in curvature with its related registering cylinder or surface and be capable of being placed substantially concentrically therewith, the registering device embodies a holder support with means for adjusting the same to place the holders used with registering cylinders of different diameters concentrically with their related cylinders.

Another object of the invention is to provide a registering device having means for accomplishing the last mentioned results, and also preferably having means for adjusting the operative parts of the device as a whole to place them in different positions most convenient for operation by different operators.

Further objects and advantages of the invention will appear from the following specification of the preferred embodiment of the invention shown in the accompanying drawings, and the novel features of the invention are set forth in the appended claims.

In said drawings:

Fig. 1 is a front elevation of a registering device embodying the invention, showing the holder for the printing plate or element in concentric relation to the registering cylinder.

Fig. 2 is an end elevation thereof.

Fig. 3 is a similar end elevation, on a larger scale of the upper portion of the device and showing the holder for the printing element with its supporting saddle moved away from the registering cylinder to permit removal of the holder from its supporting saddle.

Fig. 4 is a broken, transverse, sectional view of the main holder for the printing element, showing the supplemental holder in place thereon.

Fig. 5 is a central, longitudinal, sectional elevation of the registering cylinder and associated parts.

Fig. 6 is a transverse, sectional elevation thereof on line 6—6, Fig. 5.

Fig. 7 is an elevation partly in section, on a reduced scale, of a printing cylinder adapted for substitution in place of the registering cylinder and showing a printing element in position thereon.

Fig. 8 is a plan view of the registering device showing portions of the holder for the printing element broken away to show underlying portions.

Fig. 9 is a fragmentary, front elevation thereof.

In the preferred embodiment of the invention, illustrated in the drawings, the registering device comprises a main stationary supporting base or pedestal 10 and a head or yoke 11 which carries or supports the registering cylinder or surface 12 and other operative parts of the device, and which is mounted so as to be vertically adjustable on the base for positioning said operative parts at any required height as may be most convenient for the use or operation thereof by the particular operator of the device. As shown, the supporting head 11 has a downwardly extending, vertical post 13 which is slidable up and down in a guide hole 14 in the upper portion of the pedestal, in which the post is adapted to be adjusted vertically and held in different adjusted positions by suitable means, such as a crank or handle 15 connected by worm gearing 16 to a shaft 17 journalled on the pedestal and provided with a pinion 18 meshing with a vertical toothed rack 19 on the post 13. The head 11 can thus be adjusted up or down to the desired height and held in the adjusted position simply by appropriately turning the crank 15 in one or the other direction.

The adjustable head or yoke 11 shown, comprises a horizontal bar or elongated member 20 having fixed upright bearing arms or members 21 at its opposite ends, on which end journals for the registering cylinder, preferably formed by a central cylinder shaft, are removably mounted so as to support the cylinder for registering adjustment of the same rotatively about its horizontal axis. The bearing arms 21 may be equipped with suitable means, such as adjusting screws 23, on which the ends of the shaft bear in notches 24 in the upper ends of the arms, and by appropriate adjustment of which the cylinder can be accurately positioned with its axis truly horizontal in a vertical plane having a definite known, or predetermined relation to cooperating parts of the registering device. Said bearing screws 23 when once adjusted to properly position the cylinder will ensure precisely like location of different cylinders having shafts of the same diameter, and will also function to locate different cylinders having shafts which differ in diameter with their axes truly horizontal and in the same predetermined vertical central plane. Any other suitable means for thus removably supporting and centering the shaft of the cylinder on the supporting head or yoke could be employed.

Projecting forwardly from and rigid with the head is a supporting bracket 25 provided with a rigidly fixed, upright, preferably hollow, rectangular box or guide 26, in which is adjustable vertically a post 27. On the upper end of this post is fixed a horizontal guide or support 28 on which a saddle or support for removably mounting a holder for a printing element or plate, is supported for adjustment horizontally toward and from the registering cylinder in a direction perpendicular to the axis of the cylinder. The post 27 is slidably fitted in the guide 26 for vertical adjustment therein, while being held in a true, vertical position and held against lateral turning play or motion. The post 27 of the saddle support may be adjusted vertically in its guide 26 by a vertical screw shaft 29 which is suitably journalled and held from endwise movement on the bracket 25, and is provided with a screw threaded portion that turns in a threaded, vertical hole in the post 27, so that by turning the screw shaft the post can be adjusted and held in any desired vertical adjustment. This shaft may be turned by a crank or handle engaged with its lower end, which may be suitably shaped for the engagement of the crank or handle therewith.

As shown, the registering cylinder 12 comprises opposite, circular ends or heads 30, 31, and a hollow cylindrical shell or tube 32, preferably of suitable transparent material which, at its opposite ends encircles and is supported by said cylinder heads, which may be secured on a central cylinder shaft 33, as by set screws 34 in threaded holes in the hubs of the heads. Preferably the cylinder tube 32 is fixedly attached at one end to the left hand cylinder head 30, and its opposite end is provided with an edge notch 35 into which projects a lug 36 on the periphery of the other head 31, so as to connect the cylinder tube with the head 31 to turn therewith, but permit the removal or disengagement of the tube from the head. The lug 36 and its cooperating notch in the end of the cylinder tube are preferably of rectangular shape, and the stud fits accurately in the notch, thereby insuring a precise, predetermined location of the tube with reference to the head 31, circumferentially thereof, while permitting the removal of the tube and its replacement by another tube of like dimensions in precisely the same position relatively to the cylinder head 31. Thus, with the head 31 secured in a predetermined or known position on the shaft 33, one cylinder tube can be quickly and easily removed and replaced by another like tube in exactly the same relation to the cylinder shaft.

The cylinder is provided on its peripheral surface with indicia for enabling the printing element, which is in the form of a thin, flexible plate or film adapted to conform to the curvature of said peripheral surface, to be registered or placed in a prescribed or predetermined location and position on the cylinder surface, said indicia preferably consisting of a thin, straight line 37 extending longitudinally of the cylinder parallel with its axis and in central alinement with the lug notch 35, and a thin line 38 extending circumferentially of the peripheral surface at its mid-length in a transverse plane perpendicular to the axis of the cylinder, or so that the two register lines 37, 38 are disposed precisely at right angles to each other.

At one end of the cylinder 12, the right hand end as shown in the drawings, is a cylindrical registering head comprising relatively rotatable disks 40, 41 arranged face to face and one having a graduated scale 42 on its periphery cooperating with an index mark or pointer 43 on the other disk to indicate relative rotary adjustments of the disks. One disk 40, is secured, as by a set screw 44 to shaft 33, to turn with the cylinder, while the other disk 41 is shown as annular and rotatably mounted on a central boss or hub of the disk 40, on which it is held by a retaining ring 45. The second disk 41 may be

releasably held from rotation by a suitable device, such as a slide or member 47 mounted on the supporting head 21 and adapted to be moved into engagement with a cooperating toothed segment or part 48 secured on disk 41, as by a pinion 49 suitably journalled on the head 21 and meshing with rack teeth on the slide 47. The locking segment 48 may be suitably fastened on the disk 41, as by screws passing through elongated slots in the segment, so that it can be adjusted circumferentially of the disk, as may be necessary to ensure the locking of the disk 41 with precision in a required registering position. The pinion 49 may be turned for locking and releasing the registering disk 41 by a crank or handle 50 on the shaft of the rack pinion. While the registering scale 42 is shown on the periphery of the disk 40 and the pointer 43 on the disk 41, they could be reversed with the scale on the disk 41 and the pointer on the disk 40. Means, such as a lock screw 52 arranged to turn in a radial threaded hole in the annular disk 41 and bind it to the hub of the disk 40, is shown for releasably locking the disk and ring together against relative rotation, the screw having a knurled head for turning it. When the registering disk 41 is held stationary by the locking device 47, if the locking screw 52 is loosened, the registering disk 40 and the cylinder can be turned together relatively to the disk 41 to any required rotary adjustment, indicated by the scale and pointer, and the registering disk and cylinder can then be locked in this adjustment by tightening the lock screw 52; or when necessary, the locking device 47 can be released to free the disk 41 to permit rotation of the cylinder 12 and disk 40, together with the disk 41 which may be locked by the screw 52 to the disk 40, to thus place the disk 41 in a different zero position. Then the disk 41 can be locked in this position and the other disk and cylinder 12 can be rotatively adjusted a required amount with reference to such new zero position by loosening the screw 52, after which the cylinder 12 can be secured in the new adjustment by means of screw 52. The registering cylinder 12, when released from its locking means can be rotatively adjusted by any suitable means, such as a spoke or pin 53 inserted in one of a series of peripheral holes in a wheel 54 on the end of the cylinder shaft.

55 represents a removable holder or carrier to which a printing plate or element, which has been adjusted to a prescribed or predetermined registered position on the registering cylinder 12, is attached for transferring the printing element from the registering device for use in the registered position predetermined by the registering device, in a press or means for making prints from the said element. Said holder 55 is preferably a vacuum holder of the sort disclosed in my U. S. Patent #2,174,882 granted Oct. 3, 1939, by which the printing plate or element is held by vacuum in the press, and for convenience, it is herein sometimes called the vacuum holder, but it is to be understood that it is not thereby intended to necessarily restrict this invention to the use of a vacuum holder for the printing element, but the claims which do not specifically recite a vacuum holder are intended to comprehend a suitable holder of other type adapted to hold the printing element for cooperation with a cylinder substituted for cylinder 12 of this device or with a printing press cylinder, as hereinafter explained.

The vacuum holder is of curved or segmental

cylindrical shape to conform approximately to the surface curvature of the registering cylinder 12 and of the printing press cylinder with which the printing element is to be used, different vacuum holders for use with printing cylinders of different diameters being of different curvatures, in accordance with the diameters of the cylinders with which the holders are to be used. Also, registering cylinder 12 of different diameters will be used in this device for registering printing elements in vacuum holders appropriate for printing cylinders of corresponding different diameters. It is therefore necessary to mount the vacuum holder in the registering device so that the holders for different sized cylinders can be adjusted relatively to the cylinders, as may be required by reason of the different diameters of the cylinders.

The means shown for thus removably and adjustably mounting said holder 55 are constructed as follows: 56 represents a saddle or support for the holder. This saddle, as shown, is suitably hinged, as by a hinge pin 57 at its outer end to a slide or base 58 arranged to slide horizontally toward and from registering cylinder 12 on the vertically adjustable guide 28, the slide being guided in suitable ways 59 in opposite side pieces of the guide 28. The saddle slide may be adjusted on the guide by suitable means, as a pinion 60 meshing with a toothed rack 61 on the slide 58 and secured on a shaft 62 which is suitably journalled in a bearing on the guide 28 and is provided at its outer end with a crank or handle 63 for turning the pinion. The slide may be secured in adjusted positions on the guide, by a set screw 64 on guide 28 and having a knurled head for turning it to hold and release the slide. The vacuum holder 55 is thus adapted to be adjusted horizontally toward and from the registering cylinder 12 as may be necessary, depending upon the diameter of the cylinder, in order to locate the curved vacuum holder concentric with cylinder 12, and the hinged saddle 56 is adapted to swing on the slide 58 to carry the holder 55 to and from co-operative relation with the registering cylinder for placing a registered printing element in the holder on a cylinder and for access to a printing element in the holder. The vacuum holder is preferably of substantial semi-cylindrical form to adapt it to snugly embrace the registering cylinder around substantially half of its circumference, and in order to readily free the holder from the cylinder for removing the printing element, a cam or eccentric lever 65 may be suitably pivoted on the saddle 56 and adapted to work against an adjacent part of the slide 58 so that by swinging the lever 65, the saddle will be forcibly lifted somewhat away from the slide to a position in which it can be easily grasped and moved to carry the vacuum holder away from the registering cylinder. The saddle may also be provided with a securing screw 66 having a knurled head for turning it and adapted to be screwed into a threaded hole in the slide for securing the saddle down firmly against its slide 58.

Thus, by means of the construction described, the saddle or support for the vacuum holder 55 is hinged to a slide base which is adjustable horizontally toward and from the axis of the registering cylinder 12 on the guide or support 28 which, in turn, is adjustable vertically. Therefore, the saddle or support for the holder can be adjusted both horizontally and vertically, as may be necessary for the use of holders with

the cylinders of different diameters, to ensure concentricity of the holder with the cylinder when the holder is placed to embrace the cylinder. If cylinders of different diameters, but having shafts of the same diameter, are used in the registering device, the cylinders, regardless of their different diameters, when placed in the supporting head 11 will have their axes coincide with the same axial line in the device, but if different cylinders having shafts of different diameters are used, then the axes of such cylinders when mounted in the supporting head 11 would not coincide with the same axial line, but would be located at different elevations, and in such case, the supporting saddle for the vacuum holder for use with a particular cylinder would have to be adjusted vertically, as well as horizontally, in order to place the holder concentrically with the cylinder. The holder-supporting means described provides for such different contingencies.

The vacuum holder 55 shown comprises an open main frame of generally rectangular form having parallel front and rear side bars or members 70, 71 connected by end bars or members 72 which are curved in approximate conformity with the periphery of a cylinder of the particular diameter with which the holder is intended to be used, and a thin supplemental frame which is similar in general form to the main frame, having curved or flexible end parts 73 connected by parallel front and rear side parts 74. Both the supplemental frame and the main frame thus have large central openings through which the printing plate or element 75 which is secured on the holder is exposed to light and view. The main holder frame is removably secured on the supporting saddle 56 as by shouldered thumb screws 76 passing through holes in a cross bar 76*a* of the main holder frame, and in order to insure the mounting of the holder exactly in a predetermined known position on the saddle, the front bar of the main holder frame is preferably provided with two dowel pins 77 which fit accurately in dowel holes in the saddle cross bar 76*a*. The supplemental holder frame is mountable removably in predetermined position in the main holder frame, preferably by dowel pins 78 located centrally at the front and rear ends of the supplemental frame adapted to be seated in dowel holes or seats 79, 79*a* in which they fit accurately, located centrally at the front and rear ends of the main holder frame. The supplemental holder frame is preferably made of thin, resilient sheet metal or analogous material adapting it to flex or spring sufficiently to conform accurately to the curvature of a printing element on the registering cylinder so as to lie in close contact, face to face, with the outer surface of the printing element throughout the area of the contacting surfaces, and be fastened thereon, for which purpose the supplemental frame may be provided with alined, spaced holes 80 through its end and side parts, whereby when this frame has been placed in face to face contact with a printing plate or element placed on the registering cylinder, the printing element can be fastened to the frame by applying strips of adhesive tape or the like 81 on the outer face of the frame over these holes and pressing the tape into the holes 80 so as to adhere to the printing element and thus hold the latter securely in place on the frame.

The vacuum holder, as fully disclosed in my said Patent No. 2,174,882, embodies means whereby when the holder with a printing plate or element secured on it, is placed on a cylinder of a photographic contact or other printing machine, the printing element will be held firmly by vacuum in close intimate contact with the surface of the printing machine cylinder and prevented from shifting on the cylinder, but further detailed description of the vacuum holder is believed unnecessary to a correct understanding of this invention. Further explanation of the vacuum holder, if necessary, may be obtained from said patent.

In the use of the hereindescribed registering device, the printing plate or element is laid on the registering cylinder 12 and shifted thereon, as may be necessary, to place suitable register marks or indicia 82 on the printing element in accurate registration with the longitudinal and transverse register marks 37 and 38 of the registering cylinder. In the case of a transparent printing film, either a negative or positive, the registering lines 37 and 38 of the registering cylinder can be seen through the transparent film and registered with the register marks 82 thereof. In the case of a metal or non-transparent printing plate, the latter can be provided with register marks 82*a* on its extreme edges or with small perforations 82*b* passing through the plate and adapted to be registered with the register lines of the cylinder 12 for placing the plate in the required registered position on the cylinder. A suitable lamp 83 is shown for illuminating the transparent registering cylinder for facilitating the registering of the printing element thereon.

When the printing plate or element has been thus registered or located in the required or predetermined position on the registering cylinder, it is releasably held firmly in place thereon from shifting in any direction out of its registered position until it is attached to the auxiliary frame of the vacuum holder. Vacuum means are shown for this purpose comprising a vacuum plate 84 which may be transparent and may be suitably supported within the cylinder against the inner surface of the cylinder tube 32, by cementing it to the cylinder tube or otherwise, and is provided around the marginal portions of its outer side with connecting channels 85 which communicate by a passage 86 through the plate with a pipe or flexible tube 87 leading to any suitable vacuum pump or device (not shown) for exhausting air from said pipe and channels, said vacuum pipe or tube being equipped with a valve 88, preferably pedal actuated, for applying and breaking the vacuum. Cylinder tube 32 is also provided with small spaced perforations 89 passing therethrough which may be grouped so as to be located beneath the marginal portions of the printing element on the cylinder and in communication with the channels 85 of the vacuum plate 84. Thus, when a printing element is laid on the cylinder over the perforations 89 and registered as required, on the cylinder, then by operating the pedal valve to apply the vacuum, the printing plate will be drawn to a smooth, firm contact with the surface of the cylinder and will be held thereon against shifting in any direction from the position in which it has been registered. The flexible supplemental frame of the vacuum holder 55 is then placed on the outer face of the registered printing element on the cylinder, and shifted thereon, as may be necessary, to place registering indicia or means 90 on the frame in accurate register with the register marks 82 of the printing element, and the frame is then at-

tached to the printing element by applying the adhesive strips, as before explained. After thus attaching the printing plate to the supplemental holder frame, valve **88** is operated to break the vacuum, which frees the printing plate from the registering cylinder, and the supplemental frame can then be lifted from the cylinder carrying the printing element with it, the printing element being held by the holder frame in the predetermined position in which it was registered on the registering cylinder.

Thus, the printing element is held in a predetermined registered position on the registering cylinder and the supplemental frame **73—74** is secured in a predetermined position on this registered printing element, so that when the supplemental frame with the attached printing element is mounted in predetermined position in the vacuum holder **55** by inserting the dowels of the supplemental frame in the dowel seats of the main frame, the printing element will be supported in predetermined known positional relation to the registering cylinder, because the vacuum holder **55** is maintained in a predetermined known position with reference to the cylinder **12** by its dowel pin and hole connections with the supporting saddle **56**, of the registering device. The seat **79***a* on the vacuum holder for the dowel at the rear end of the supplemental frame may be arranged to have some play on the holder to allow for the limited flexing or springing necessary for conformability of the printing element and frame to the curvature of the cylinder. as explained in my said patent, but since this play is in a straight line forwardly and rearwardly and the front dowel of the supplemental frame is held at a fixed point on the holder, the supplemental frame and printing element will still have the required predetermined position on the holder. If now, the vacuum holder **55** is mounted on the saddle of a printing machine having a similar saddle correspondingly positioned relatively to the printing cylinder of like diameter by inserting the dowels of the vacuum holder in the dowel holes of the printing machine saddle, then if the vacuum holder is moved to place the printing element against the printing cylinder, the printing element will be located in precisely the same relative position on the printing cylinder that it occupied when registered on the registering cylinder **12**. Therefore a printing element can be readily registered or positioned on the registering cylinder to locate it on or make prints therefrom on a printing cylinder in any prescribed or predetermined position.

Furthermore by using a cylinder **12** such as described having a removable peripheral tube **32**, or other construction adapting its removal and replacement in the same position in the registering device, after a printing plate has been registered in predetermined position thereon and attached to and removed with the supplemental holder frame **73—74**, as above explained, the registering cylinder tube **32** can be removed and a tube or cylinder **91**, Fig. 7, of like dimensions and form from a printing press substituted in place thereof in the same position in the registering device. Then by mounting the supplemental holder frame **73—74** with the attached printing plate on the saddle **56** and coating the inner surface of the printing plate with a suitable cement or adhesive, the vacuum holder **55** can be operated to place and hold the printing plate on the periphery of the printing cylinder, and the plate will be fixed on the cylinder in exactly the predetermined relative position in which it was registered in the registering cylinder. The cylinder with the plate in the prescribed position thereon can then be removed and placed in the printing press to print therefrom.

The registering device herein disclosed thus enables an image to be registered with reference to the master position lines on the registering cylinder **12** and attached to a vacuum holder so that the image on a film or printing plate is held in a predetermined relation to a cylinder whereby two or more images can be positioned in exact known relation to each other so that two or more color images comprising a set or two or more sets can be positioned in required relation and in exact register to each other on the surfaces of cylinders for printing therefrom. The cylinder constructed as described with the removable and replaceable peripheral tube is advantageous in such connection, as thereby the cylinders are of light weight and can be conveniently handled and carried about, and printing elements can be readily applied in registered position on several cylinders ready for use as required in a printing machine. While the registering member **12** is preferably in the form of a cylinder, it will be apparent that for many purposes a complete cylinder would not be required for supporting and registering the printing elements, but that a sufficiently large segment of a cylindrical surface would adequately serve the purpose and is comprehended in the claims.

A fastening device **92** is shown in Figs. 2 and 3, arranged to engage the free, rear end of the vacuum holder **55** for securing the holder when it is operated to hold the printing element in place on the printing or other cylinder in the registering device. As shown, this fastening means consists of a strip of articulated links attached at one end to an arm **93** of the cylinder support **11** and adapted to be attached to the free end of the holder **55**. Thumb screws **94** pivotally connecting the links to each other and to the holder and arm **93**, enable adjustment or flexing of the strip, as necessary, to suit different sized holders **55** and to secure the holder firmly in place against the cylinder.

I claim as my invention:

1. A registering device of the character described comprising a cylinder, a support on which said cylinder is mounted and adjustable rotatively about its axis, said cylinder serving to support a printing element placeable on and conforming to the curvature of the periphery of said cylinder, registering means operable to locate said printing element in a predetermined position on the cylinder, a holder for said printing element substantially conforming to the curvature of the printing element on the cylinder, means associated with said cylinder and operable independently of said holder for releasably retaining said printing element in said registered position on the cylinder, means for attaching the printing element in a predetermined position to said holder while it is retained in its said registered position on the cylinder, said means for retaining the printing element on the cylinder being operable to release the printing element when attached to said holder for removal with the holder from the cylinder, a support for said holder mounted in a definite relation to said cylinder and movable to carry the holder toward and from the cylinder, and said holder having means cooperable with said sup-

port for removably mounting said holder in a predetermined position on said support.

2. A registering device of the character described comprising a support having a cylindrically curved surface forming a support for a printing element placeable on and conforming to the curvature of said surface, said curved surface having register indicia cooperative with indicia on said printing element to locate said element in a predetermined position on said surface, a holder for said printing element substantially conforming to the curvature of the printing element on said surface, means associated with said support and operable independently of said holder for releasably retaining said element in such predetermined position on said surface, means for attaching the printing element in a predetermined position to said holder while retained in its said registered position on said surface, said means for retaining the printing element on said curved surface being operable to release the printing element when attached to said holder for removal with the holder from the curved surface, a support for said holder mounted in a definite relation to said surface and movable to carry the holder toward and from said surface, and parts on said holder cooperable with parts of said holder support for removably mounting said holder in a predetermined position on said holder support relatively to said curved surface, said parts of said holder being cooperable with a holder support of a cylinder printing machine for mounting the holder in the corresponding relation to the printing machine cylinder that it occupied relatively to said cylindrically curved surface.

3. A registering device of the character described comprising a cylinder, a support on which said cylinder is mounted and adjustable rotatively about its axis, said cylinder serving to support a printing element placeable on and conforming to the curvature of the periphery of said cylinder, registering means for locating said printing element in predetermined position on the cylinder, a holder for said printing element substantially conforming to the curvature of the printing element on the cylinder, means operable independently of said holder for releasably retaining said printing element in such registered position on the cylinder, means for attaching the printing element in a predetermined position to said holder while retained in its said registered position on the cylinder, said means for retaining the printing element on the cylinder being operable to release the printing element when attached to said holder for removal with the holder from the cylinder, a support for said holder mounted in a definite relation to said cylinder and movable to carry the holder toward and from the cylinder, said holder having means cooperable with said support for removably mounting said holder in a predetermined position on said support, means for adjusting said holder support horizontally toward and from the axis of the cylinder, and means for adjusting said holder support vertically relative to the horizontal plane of the cylinder axis.

4. A registering device of the character described comprising a cylinder, a support on which said cylinder is mounted and adjustable rotatively about its axis, said cylinder serving to support a printing element placeable on and conforming to the curvature of the periphery of said cylinder, registering means for locating said printing element in a predetermined position on the cylinder, a holder for said printing element substantially conforming to the curvature of the printing element on the cylinder, means operable independently of said holder for releasably retaining said printing element in such registered position on the cylinder, means for attaching the printing element in a predetermined position to said holder while retained in its said registered position on the cylinder, said means for retaining the printing element on the cylinder being operable to release the printing element when attached to said holder for removal with the holder from the cylinder, a support for said holder mounted in a definite relation to said cylinder and movable to carry the holder toward and from the cylinder, said holder having means cooperable with said support for removably mounting said holder in a predetermined position on said support, and means for indicating the rotary adjustments of said cylinder.

5. A registering device of the character described comprising a cylinder, a support on which said cylinder is mounted and adjustably rotatively about its axis, said cylinder serving to support a printing element placeable on and conforming to the curvature of the periphery of said cylinder, registering means enabling location of said printing element in a predetermined position on the cylinder, means for releasably retaining said printing element in such registered position on the cylinder, a holder for said printing element substantially conforming to the curvature of the printing element on the cylinder, means for attaching the printing element in a predetermined position to said holder while in its said registered position on the cylinder, a support for said holder comprising a base, and a saddle hinged to said base for movement to carry the holder toward and from the cylinder, said holder having means cooperable with said saddle for removably mounting the holder in a predetermined position on said saddle, and means for adjusting said saddle base toward and from the axis of said cylinder.

6. A registering device of the character described according to claim 5, including means for adjusting said saddle base perpendicularly to its adjustment toward and from the axis of the cylinder.

7. A registering device of the character described according to claim 5, including means for adjusting said saddle base perpendicularly to its adjustment toward and from the axis of the cylinder, and register means for showing the rotary adjustment of the cylinder.

8. A registering device of the character described comprising a cylinder, a support on which said cylinder is mounted and adjustable rotatively about its axis, said cylinder serving to support a printing element placeable on and conforming to the curvature of the periphery of said cylinder, registering means enabling location of said printing element in a predetermined position on the cylinder, means for releasably retaining said printing element in such registered position on the cylinder, a holder for said printing element substantially conforming to the curvature of the printing element on the cylinder, means for attaching the printing element in a predetermined position to said holder while in its said registered position on the cylinder, a support for said holder comprising a base, and a saddle hinged to said base for movement to carry the holder toward and from the cylinder, said holder having means cooperable with said saddle

for removably mounting the holder in a predetermined position on said saddle, means for adjusting said saddle base toward and from the axis of said cylinder, means for releasably securing said saddle base in its different adjustments, and means for releasably securing said saddle from movement relatively to said saddle base.

9. A registering device of the character described according to claim 5, including a cam device cooperating with said saddle and saddle base for forcibly initiating swinging movement of said saddle away from the saddle base.

10. A registering device of the character described comprising a cylinder, a support on which said cylinder is mounted and adjustable rotatively about its axis, said cylinder serving to support a printing element placeable on and conforming to the curvature of the periphery of said cylinder, registering means enabling location of said printing element in a predetermined position on the cylinder, said cylinder comprising opposite heads, one of which heads is removably mounted, and a hollow cylindrical shell secured at one end to said removable cylinder head and removably supported at its opposite end on said other cylinder head, whereby said cylinder shell is removable with said removable head, said cylinder shell and said other head having interengaging parts for positioning said shell always in the same circumferential relation to said other head when the shell is supported thereon, means for releasably retaining said printing element in such registered position on the cylinder, a holder for said printing element substantially conforming to the curvature of the printing element on the cylinder, means for attaching the printing element in a predetermined position to said holder while in its said registered position on the cylinder, a support for said holder mounted in a definite relation to said cylinder and movable to carry the holder toward and from the cylinder, and said holder having means cooperable with said support for removably mounting said holder in a predetermined position on said support.

11. A registering device of the character described comprising a support having a cylindrically surved surface and serving to support a printing element conforming to the curvature of said surface, said support being mounted for rotary adjustment about the axis of said curved surface, means which register rotary adjustments of said curved surface, registering means on said curved surface and printing element cooperable to locate said printing element in a predetermined position on said surface, a holder for said printing element substantially conforming to the curvature of the printing element on said surface, means operable independently of said holder for releasably retaining said printing element in such registered position on said surface, means for attaching the printing element in a predetermined position to said holder while in its said registered position on said surface, said means for retaining the printing element on said curved surface being operable to release the printing element when attached to said holder for removal with the holder from said curved surface, a support for said holder mounted in a definite relation to said curved surface and movable to carry the holder toward and from said surface, said holder having means cooperable with said support for removably mounting said holder in a predetermined position on said support relatively to said curved surface, and means for adjusting said holder support toward and from the axis of said curved surface to different definite relations to said axis.

12. A registering device of the character described according to claim 11, in which vacuum means are provided for releasably retaining the printing element in said registered position on said curved surface.

13. A registering device of the character described comprising a hollow illuminable cylinder having a transparent periphery forming a support for a printing element placeable on and conforming to the periphery of said cylinder and having register lines on its periphery for cooperation with indicia on said printing element to locate said element in a predetermined position on the cylinder, vacuum means for releasably holding said element in such registered position on the cylinder, a holder for said printing element substantially conforming to the curvature of the printing element on the cylinder, means for attaching the printing element in a predetermined position to said holder while in its said registered position on the cylinder, a support for said holder mounted in a definite relation to said cylinder and movable to carry the holder toward and from the cylinder, and said holder having parts cooperable with parts of said holder support for removably mounting the holder in a predetermined position on the support.

14. A registering device of the character described comprising a cylinder having a transparent periphery, a support in which said cylinder is mounted and adjustable rotatively about its axis, said cylinder providing a support for a printing element placeable on and conforming to the curvature of the periphery of the cylinder and having on its periphery register lines cooperative with register indicia on said printing element to locate said printing element in a predetermined position on the cylinder, illuminating means which make the register lines of said cylinder visible for registration with said indicia of said printing element, means for releasably retaining said printing element in such registered position on the cylinder, a holder for said printing element substantially conforming to the curvature of the printing element on the cylinder, means for attaching the printing element in a predetermined position to said holder while in its said registered position on the cylinder, a support for said holder mounted in a definite relation to said cylinder and movable to carry the holder toward and from the cylinder, and said holder having means cooperable with said support for removably mounting said holder in a predetermined position on said support.

15. A registering device of the character described comprising a member having a curved surface serving to support a flexible printing element placeable on and conformable to the curvature of said surface, said curved surface and said printing element having registering means cooperable to locate the element in a predetermined position on said surface, a holder for said printing element which is conformable to the curvature of and is placeable in face to face contact with said printing element, said holder and printing element having cooperable means for registering the holder in a predetermined position on the printing element, means associated with said supporting member and operable independently of said holder for releasably retaining said element in such predetermined position on said surface, means for attaching said registered holder to the printing element while the latter is retained on

said curved surface, said means for retaining the printing element on said curved surface being operable to release the printing element when attached to said holder for removal with the holder from said curved surface, a support for said holder occupying a definite relation to said curved surface and movable toward and from the same, and cooperable means on said holder and support for removably mounting the holder in a predetermined position on said holder support.

16. A registering device of the character described comprising an illuminable curved transparent member having an exterior curved surface forming a support for a printing element placeable on and conforming to the exterior curved surface of said member and having registering means on said surface for cooperation with indicia on said printing element to locate said element in predetermined position on said curved surface, vacuum means for releasably holding said element in such registered position on said surface, a holder for said printing element substantially conforming to the curvature of the printing element on said curved surface, said vacuum means and said holder for the printing element being

located at opposite sides of said curved supporting member, means for attaching said printing element in a predetermined position on said holder while retained in its said registered position on said surface, a support for said holder mounted in a definite relation to said curved member and movable to carry the holder toward and from said member, and said holder having parts cooperable with parts of said holder support for removably mounting the holder in a predetermined position on the support.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,052,556	Davis	Sept. 1, 1936
2,095,542	Claybourn	Oct. 12, 1937
2,104,553	Claybourn	Jan. 4, 1938
2,091,280	Huebner	Aug. 31, 1937
2,174,882	Huebner	Oct. 3, 1929
1,160,579	Connelly	Nov. 16, 1915