Sept. 13, 1949. W. C. HUEBNER 2,481,928

PREDETERMINED REGISTERING DEVICE FOR PRINTING ELEMENTS

Filed Sept. 27, 1944

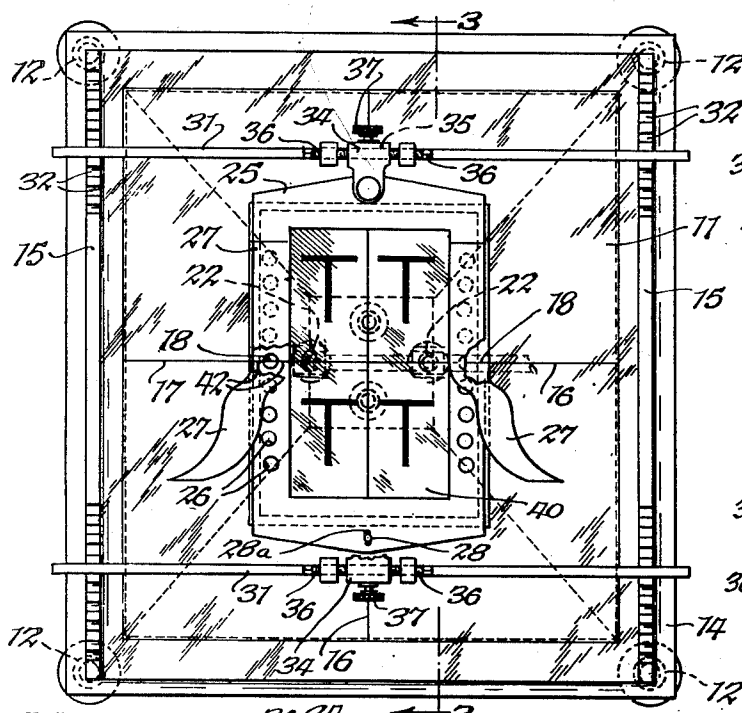

Fig. 1.

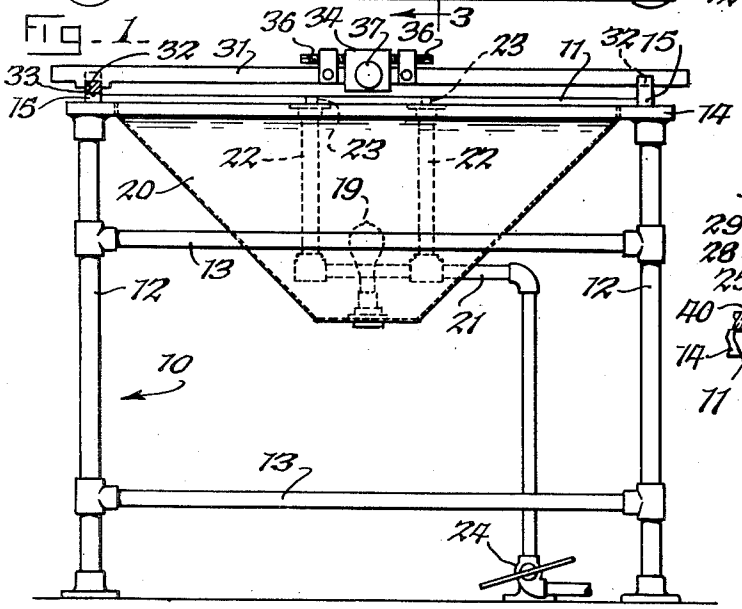

Fig. 2.

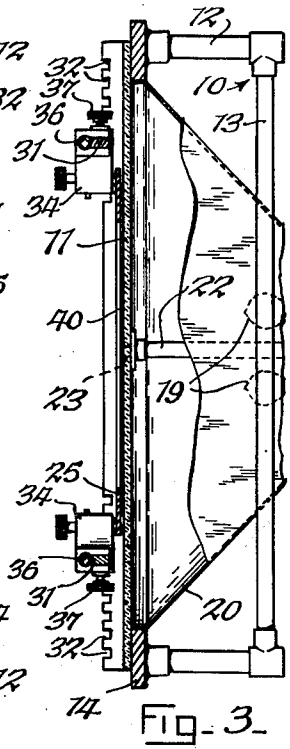

Fig. 3.

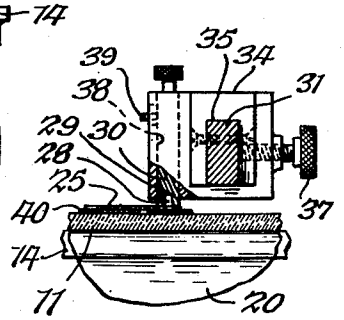

Fig. 4.

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Patented Sept. 13, 1949

2,481,928

UNITED STATES PATENT OFFICE

2,481,928

PREDETERMINED REGISTERING DEVICE FOR PRINTING ELEMENTS

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Application September 27, 1944, Serial No. 555,930

4 Claims. (Cl. 33—184.5)

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

As one of its purposes, the invention provides means whereby thin or flexible printing plates which are to be mounted in prescribed positions upon the cylinders or plate carriers of electronographic or other printing presses or machines can be expeditiously and easily registered or positioned independently of, or outside of the printing machine, before being mounted in the latter, so that they will be accurately located in the prescribed positions when placed for use in the printing machine without the necessity of then adjusting or registering them. Secondly, the invention provides means by which the positions of films to be used in making photographic contact prints on the sensitized printing cylinders or elements of printing apparatus can be readily predetermined with accuracy preparatory to placing the films in the apparatus for photographically producing images therefrom on the sensitized surfaces suitable for development and etching, as needed, for example, in the preparation of printing cylinders or other surfaces for intaglio printing. In the case of printing plates which are to be mounted on the printing cylinders or elements, they can be of thin, flexible or resilient sheet material which will readily conform to the surfaces on which they are to be mounted, and the backs of the plates can be cemented to said surfaces with the printing faces of the plates facing outwardly so that they can be inked and prints made therefrom.

Registering means according to my invention thus have two distinct purposes or uses since they will function equally well for securing predetermined register either of printing plates on the cylinders or other plate-supporting elements of printing presses, or of films in contact photographic printing or composing machines.

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

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.

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In said drawings:

Fig. 1 is a plan view of a registering device embodying my invention, showing the portable holder or frame for the printing plate or element partly broken away to expose to view portions of the underlying printing element.

Fig. 2 is a front elevation thereof, partly in section, on line 2—2, Fig. 1.

Fig. 3 is a fragmentary longitudinal, sectional elevation thereof on line 3—3, Fig. 1.

Fig. 4 is a sectional elevation on a larger scale, showing one of the keepers or holding devices for the portable holder for the printing element.

In the preferred embodiment of the invention illustrated in the drawings, the registering device comprises a plate or member providing a registering surface on which a printing element, whether a transparent positive or negative film or an opaque printing plate, is adapted to be laid and placed in a predetermined, registered position, by means of cooperating registering indicia on the registering surface and on the printing element, means such for instance, as suction or vacuum-applying means for releasably retaining the printing element in place on said surface so as to prevent it from shifting out of the registered position on said surface, a portable holder or frame which is adapted to be placed on and attached to the printing element, and means whereby said portable holder or frame is removably held in a predetermined relation to said registering surface and to the printing element for attachment to the latter, said portable holder or frame being removable, with the printing element attached in its registered position thereto, from the registering device for placing the printing element in the position, predetermined by the registering device, in the press or machine by which prints are to be made from the printing element.

As shown in the drawings, the device comprises a stationary stand or table frame 10 of any suitable construction, the top or top plate 11 of which forms the supporting and registering surface for the printing element. The stand or table frame shown is formed by upright posts or legs 12 at the four corners of the stand rigidly connected by longitudinal and transverse cross braces 13 and an open, rectangular, horizontal top frame 14 on which the top plate 11 forming the registering surface is suitably secured so as

to be held stationary or in fixed position, as for instance, by cementing the top plate on the top frame 14 between parallel, fixed horizontal rails 15 which project upwardly from the top frame along its opposite side edges. These longitudinal rails 15 are made accurately parallel with each other and serve in part to accurately position and hold the top plate in place between them.

Preferably, the top plate 11 forming the registering surface is made of glass or other suitable transparent or translucent material, and is provided on its top surface with longitudinal and transverse register lines 16 and 17 which cross each other at the center of the plate. The longitudinal register line 16 is made parallel with and midway between the longitudinal rails 15 or the side edges of the top plate, and the transverse line 17 is perpendicular to the longitudinal line at its center point, so that by laying a printing film or element on the surface of the plate 11 and shifting it as may be necessary to place cross register lines, marks or indicia 18 correspondingly located on the printing film or element in coincidence or registration with the register lines of the registering surface, the printing film or element can be positioned exactly in a required centered or registered position on the registering surface. Electric or other suitable lamps 19 are shown in a lamp housing or casing 20 beneath the registering plate for illuminating the same, so that the register lines of the plate and film are made readily visible to facilitate the registration of the register lines or marks of the film with those of the registering surface.

In the use of this registering device, the printing film or element is placed or registered in the predetermined position on the registering surface, as explained, and is attached in this position to a portable holder or frame which bears a predetermined relation to the registering surface and by means of which the printing element is transfered in its said registered position to the printing machine or apparatus by which prints are to be made from the printing element in like, predetermined position on a print-receiving surface. It is important to retain the printing element in the position to which it has been adjusted on the registering surface, or, that is, to prevent it from shifting out of such registered position while applying and fastening the portable holder or frame to the printing element. Suction or vacuum-holding means are shown for this purpose, comprising a pipe or tube 21 which is connected with a suction pump or vacuum-creating device (not shown) for exhausting air from the pipe, which may be provided with branches 22 cemented or otherwise suitably secured at their ends to the registering plate 11 in communication with holes 23 that pass through the plate, so that air can be exhausted from between its upper surface and the printing element lying thereon over the holes 23, whereby the printing element will be held firmly down against the registering surface and prevented from shifting thereon out of its registered position. The vacuum pipe or tube 21 may be equipped with a treadle-actuated or other suitable valve 24, by actuation of which the suction or vacuum can be conveniently applied and broken for holding and releasing the printing element.

25 represents the portable holder or frame which is attached in predetermined position to the registered printing element for transferring the latter to and mounting it in the predetermined, required position in the printing press or

apparatus. This holder preferably consists of an open, rectangular frame-shaped piece of thin, flexible and resilient sheet metal or other suitable thin material adapted to be laid on the printing element, which has been registered on the registering surface, in contact with the marginal portions of the upper face of the printing element, so that the printing image or images on the printing element are exposed to light and view through the central opening of the holder. For the purpose of attaching the holder 25 to the printing element, the holder is preferably provided along its side or side and end portions with through holes 26, and while the holder is held in place upon the printing element, strips of adhesive or drafting tape or the like 27 are applied and caused to adhere to the uper face of the holder over the holes 26, and are pressed through the holes into contact with the underlying portions of the printing element so as to adhere thereto and fasten the printing element firmly to the underside of the holder. The holder is provided, preferably at opposite ends on its longitudinal central line, with upwardly projecting dowel pins, studs or parts 28 adapted to enter and fit slidably in holes or recesses 29 in socket pieces 30 of a keeper or holding means, whereby the portable holder 25 may be held in a predetermined or centered relation to the registering surface over the printing element while attaching the holder to the printing element. One of the dowels 28 is fixed but the other is preferably permitted slight longitudinal movement, as in a slot 28a in the holder. This enables easier insertion of the dowels in the dowel holes, and since there is no side movement, the registration is exact with the holder flat or straight.

This keeper or holding means, as shown, comprises two transverse bars 31 on which the socket pieces 30 are mounted midway between the ends of the bars, and which are adjustably connected with the longitudinal rails 15 of the main frame or stand 10 so as to be held in parallelism at right angles to the rails 15 and at greater or less distances apart at opposite sides of and equidistant from the transverse register line 17 of the registering surface, as may be necessary to accommodate portable holders 25 of different sizes. For this purpose the stationary rails 15 shown are provided with spaced, transverse notches 32 in which the transverse keeper bars 31 are adapted to be seated, the notches in the opposite rails 15 being arranged opposite to each other in pairs at different distances from and at opposite sides of the transverse register line 17 so that the bars 31 can be placed at the required different distances apart equidistant from the transverse register line 17 to suit different sized holders 25, by seating them in the appropriate pairs of notches of the rails 15. The notches may be numbered or otherwise identified to facilitate the proper placing of the keeper bars 31 for a holder of any particular size. The keeper bars 31 are also preferably provided on their undersides with notches 33 into which one of the stationary rails 15 seats to thus hold the bars from shifting in the direction of their length relatively to the stationary rails. In other words, one of the rails 15 and the transverse keeper bars are provided with interfitting notches, whereby the transverse bars are held from movement both lengthwise thereof and along the rails 15. Thus, the socket pieces 30 which receive the dowel pins of the portable holder frame, are retained midway between the stationary rails 15 or vertically over the longitudinal

register line 16 of the registering surface, and the socket pieces can be adjusted nearer to or farther from each other, as may be necessary, for receiving the dowels of holder frames of different sizes, by seating the keeper bars in appropriate pairs of notches in the stationary rail 15.

In order to locate the dowel-receiving holes of the socket pieces precisely in the vertical plane of the longitudinal register line 16, each socket piece 30 is preferably mounted on a block 34 which is slidably adjustable along its related keeper bar 31, as by providing the block with a transverse opening 35 through which the bar passes and fits slidably, and the block is adjusted lengthwise on the bar, as by screws 36 turning in threaded holes in lugs on the bar and bearing against opposite sides of the block. By appropriate operation of these screws, the block can be adjusted to locate the dowel-receiving hole of the socket piece precisely vertically above the longitudinal register line 16. Set screws 37 are also shown for locking the blocks in place when accurately adjusted on the keeper bars. The socket pieces 30 are slidable up and down in vertical bores 38 in the supporting blocks 34 for engaging them with and disengaging them from the dowel pins of the holder 25, the socket pieces being provided at their upper ends with knobs or handle portions for raising and lowering them, and as shown, being provided with lateral pins 39 projecting into vertical slots in the supporting blocks to limit the sliding movement of the socket pieces and prevent their accidental disengagement from their supporting blocks.

The use of the device for registering a transparent printing film may be described as follows: The film 40 is laid on the registering plate or surface 11 and shifted, as required, to bring the register marks or indicia 18 of the film into exact coincidence or registration with the register lines 16, 17 of the registering surface, which can be quickly and easily done, since the register lines or marks are clearly visible through the transparent registering plate and film illuminated from below by the lamps 19. Then the treadle valve 24 is actuated to cause vacuum or suction to act to retain the film firmly in the registered position on the registering surface. A portable holder 25 of appropriate size is then laid over the registered film and the keeper bars 31 appropriately adjusted to locate the socket pieces over and in position to be engaged with the dowels 28 of the holder, which is thus held in the predetermined, centered position over the printing element. The adhesive strips are then applied on the holder to fasten the printing element thereto, as before explained. Then the socket pieces are disengaged and the treadle valve actuated to break the suction to release the printing film from the registering surface, thus permitting the removal of the portable holder with the printing film attached thereto, from the device. Successive films can thus be registered in exactly like positions by similarly registering the films on the registering plate and attaching a like holding frame to each film. In this way a set of films, for instance, for the successive prints of a multi-color job, can be accurately registered quickly and easily, one with another, so that when the films attached to the portable holders are transferred from the registering device to the printing press or apparatus, the successive color impresssions can be made in register with great precision in the positions required as predetermined by the registering device.

This device or apparatus is also adapted for

use for registering and attaching non-transparent printing plates in the required same predetermined position on the portable holders 25 for transfer in the registered position to the printing apparatus. For such work the register lines or marks 18 of the printing plate may extend to the extreme edges of the printing plate to enable their registration with the register lines 16 and 17 of the registering surface, or the register lines 18 of the printing plate may be disposed to enable their registration with appropriate register lines 42, see Fig. 1, provided on the portable holder 25, in which case, since the holder is located in a predetermined, centered position with reference to the registering surface by its keeper or holding means 30, 31, the printing plate, when taped to the holder and transferred to the printing apparatus, will be located precisely in the required position in the printing apparatus.

Since the holder 25, as explained, is thin and flexible, it is adapted for use for predetermining the position of thin, flexible printing films or plates either on a flat surface or cylinder printing apparatus. For instance, the holder with the printing element attached in registered position thereon is adapted for use in the vacuum holder for printing cylinders disclosed in my U. S. Patent #2,174,882, granted Oct. 3, 1939.

The hereindescribed portable holder and its keeper means including the socket pieces 30 on the adjustable bars for receiving the dowels 28 of the holder are capable of use in registering means such as disclosed in my copending application for U. S. Patent, Serial No. 555,929, for holding the portable holder in predetermined, centered relation to the registering surface, in place of the means disclosed in said application, comprising dowel holes in the registering surface arranged to receive dowels projecting downwardly from the portable holder.

I claim:

1. A registering device of the character described comprising a support having a registering surface for supporting a sheet-like printing element placed face to face thereon and provided with longitudinally and transversely extending central register lines cooperative with indicia on said printing element to locate the printing element in a definite registered position on said surface, guide rails on said support at opposite sides of said surface parallel with said longitudinal register line and having transverse notches arranged in pairs differently spaced from said transverse register line with the notches of each pair at opposite sides of and equidistant from said transverse register line, transverse parallel bars engageable in one or another of said pairs of notches and thereby held parallel with each other at different equal distances from said transverse register line, each of said bars having a notch in which one of said rails slidably engages to prevent shifting of said bar lengthwise of itself, a removable open frame holder placeable face to face over said printing element on said registering surface with the printing element exposed through the opening of said holder, said holder having upwardly projecting dowels located centrally at its opposite ends, and socket pieces mounted centrally on said bars to move toward and from said registering surface to releasably engage said dowels in dowel holes in said socket pieces for removably holding said holder in a predetermined centered position relative to said registering surface, said holder being attachable in said position to said printing element and remov-

able with the attached printing element from the registering device.

2. A registering device of the character described comprising a support having a registering surface for supporting a sheet-like element placed face to face thereon, means by which said printing element is locatable in a predetermined position on said surface, means for withdrawing air from between said registering surface and said printing element for releasably securing the printing element on said surface while retaining the element in said predetermined position, a portable thin frame-like holder for said printing element placeable on the upper face of said printing element and having an opening through which the element is exposed, said holder being of one or another size to accommodate different sized printing elements, and means for locating and removably holding said holder over said registering surface and printing element in predetermined centered relation to said registering surface comprising dowel pins projecting up centrally from opposite end portions of said holder, and cooperating keeper members mounted on said support and adjustable over said registering surface parallel with the longitudinal central line of the surface, a plurality of differently spaced pairs of fixed stops located with the stops of each pair equidistant longitudinally from the center of said registering surface with which stops said keeper members are engageable and thereby located in different predetermined definite relations to the registering surface depending upon the dimensions of said holder, said keeper members being releasably engageable with said dowel pins of said holder whereby said holder is removably held in said predetermined centered relation, and means for attaching said holder in said predetermined relation to said printing element while the latter is retained in said registered position on said surface, said keeper members being disengageable from said holder members for removing said holder from the registering device with the printing element attached in said registered position thereto after first releasing the printing element from said registering surface.

3. A registering device of the character described comprising a support having a registering surface for supporting a sheet-like printing element placed face to face thereon, means by which said printing element is locatable and secured in a predetermined position on said surface, a portable thin frame-like holder for said printing element placeable flatwise on the upper face of said printing element and having an opening through which the element is exposed, said holder being of one or another size to accommodate printing elements of different sizes, and means for locating and removably holding said holder over said registering surface and printing element in predetermined centered relation to said registering surface comprising dowels projecting up centrally from opposite end portions of said holder, socket pieces with dowel holes to removably receive said dowels, bars arranged transversely over said registering surface and movably supporting said socket pieces over said holder, said registering surface having a transverse central line, guide means by which said bars are adjustable parallel with said transverse central line of said registering surface to predetermined definite positions at opposite sides of and equidistant from the longitudinal central of said surface and are held parallel with each other in said adjustments, and said socket pieces being engageable in one of said adjustments with said dowels, whereby said holder regardless of its length will be held in predetermined centered relation to said registering surface, and means for attaching said holder in said predetermined relation to said printing element while the latter is retained in said registered position on said surface, said socket pieces being disengageable from said dowels for removing said holder from said registering device with the printing element attached in said registered position thereto.

4. A registering device of the character described comprising a support having an illuminable transparent plate providing a registering surface for supporting a sheet-like printing element placed face to face thereon, said plate having longitudinally and transversely extending central register lines cooperable with indicia on said printing element to locate the printing element in a predetermined registered position on said surface, upwardly projecting parallel rails on said support at opposite longitudinal edges of said plate and parallel with said longitudinal register line and having transverse notches in their upper edges arranged in differently spaced and designated pairs with the notches of each pair at opposite sides of and equidistant from said transverse register line, transverse parallel bars engageable in one or another of said pairs of notches and thereby held parallel with each other at different equal distances from and at opposite sides of said transverse register line, each of said bars having in its bottom a notch in which one of said rails slidably engages for preventing shifting of said bar lengthwise of itself, and socket pieces mounted centrally on said bar and movable thereon toward and from said registering surface and having dowel holes to releasably receive dowels projecting out centrally from opposite end portions of a portable holder for said printing element, said holder being of sheet-like open frame form adapted to be placed over and attached to the upper face of said printing element on said registering surface and expose the printing element through the opening of said holder, said adjustment of said bars to one or another of the pairs of said paired notches placing said socket pieces in position for engagement with the dowels of portable holders of predetermined different lengths.

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