

Jan. 25, 1966

W. WANIELISTA

3,230,822

METHOD AND APPARATUS FOR REPRODUCING A SUBJECT TO BE
TRANSFERRED TO A RUBBER BLANKET FOR LETTERPRESS
AND OFFSET PRINTING AND THE LIKE

Filed Feb. 12, 1963

6 Sheets-Sheet 1

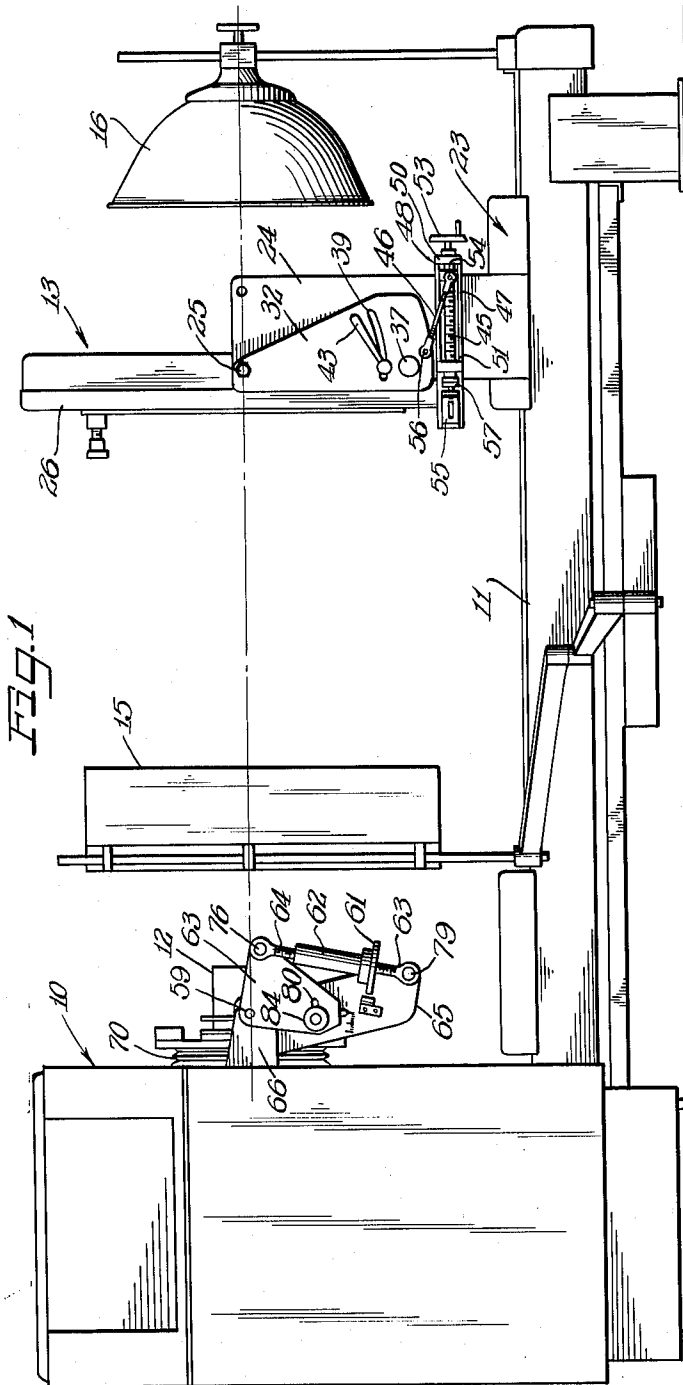


FIG. 3

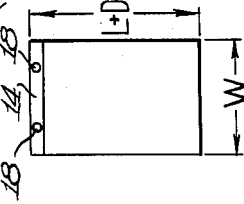
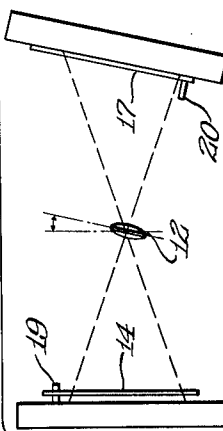
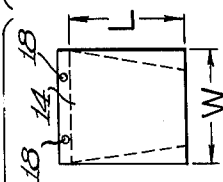
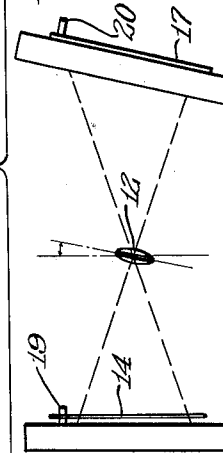


FIG. 2



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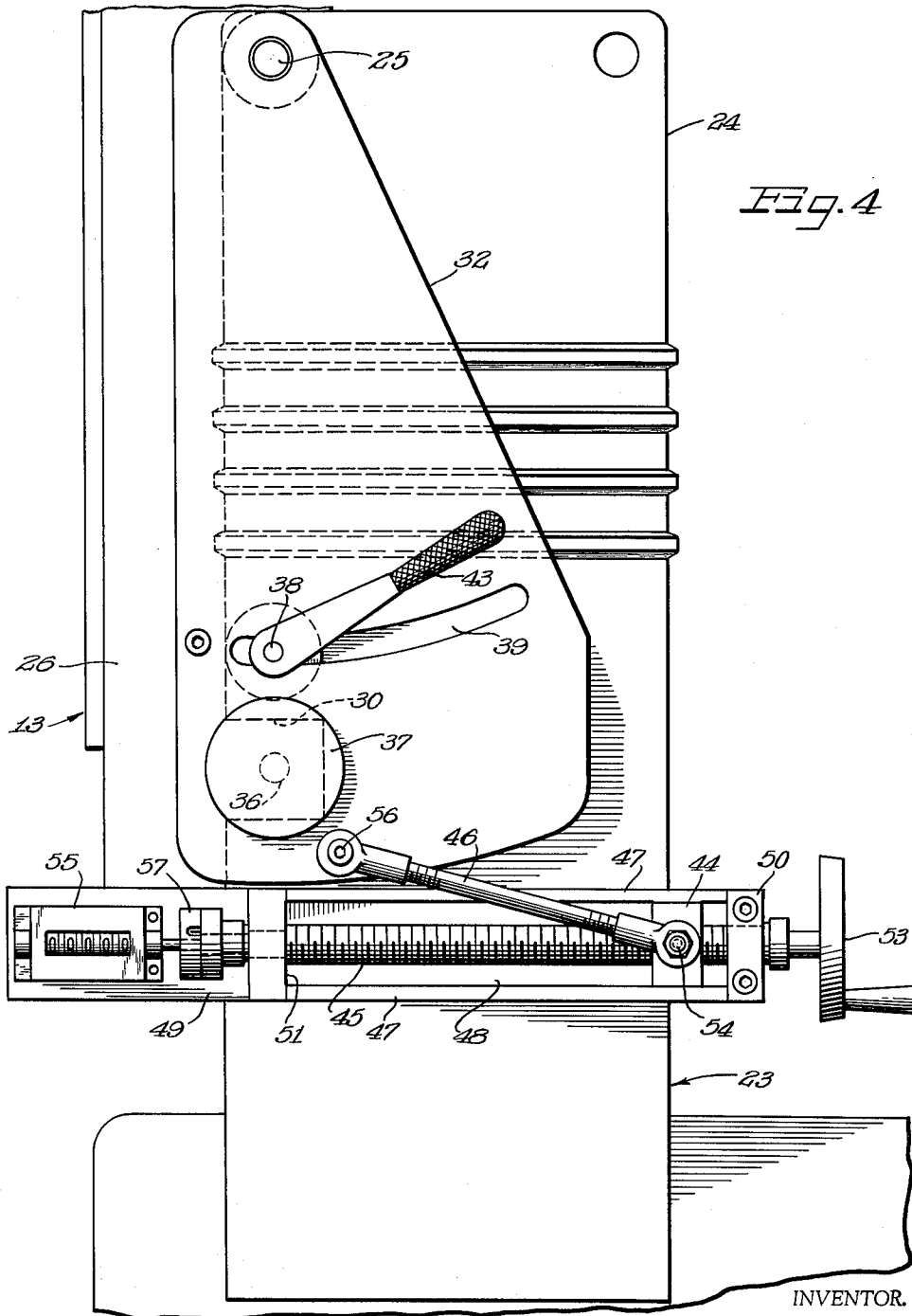


Fig. 4

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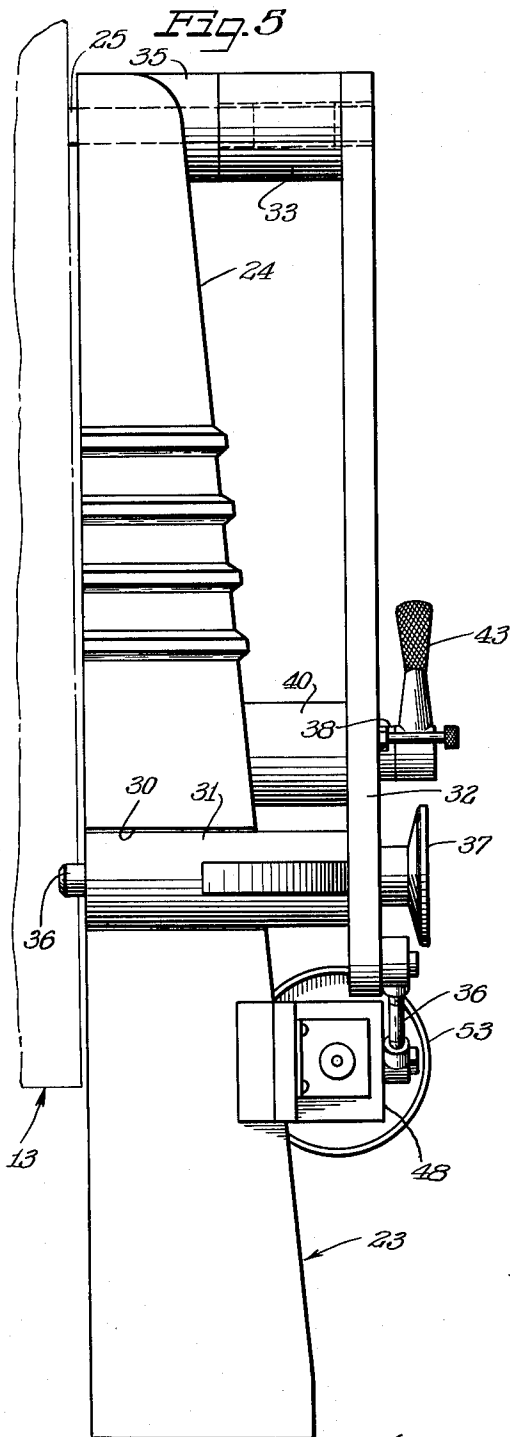
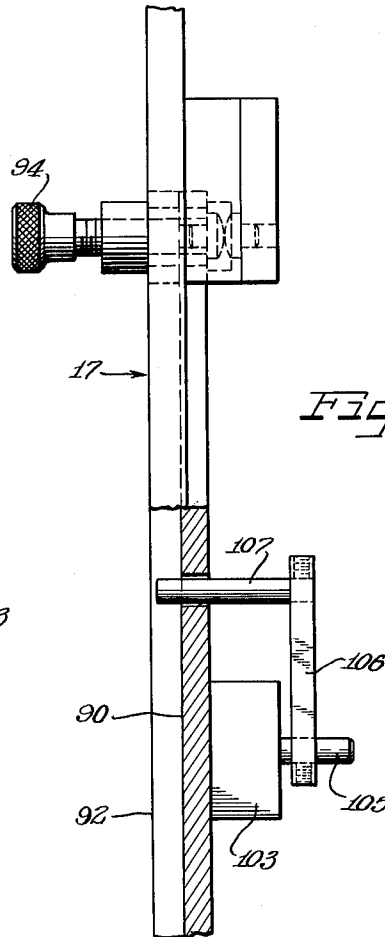
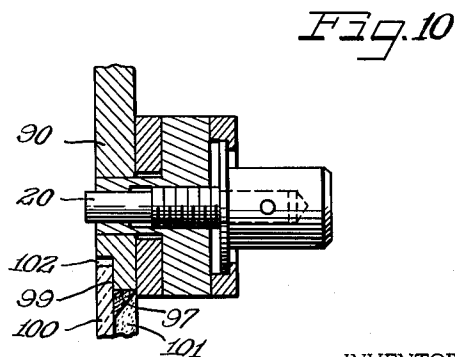
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6 Sheets-Sheet 3



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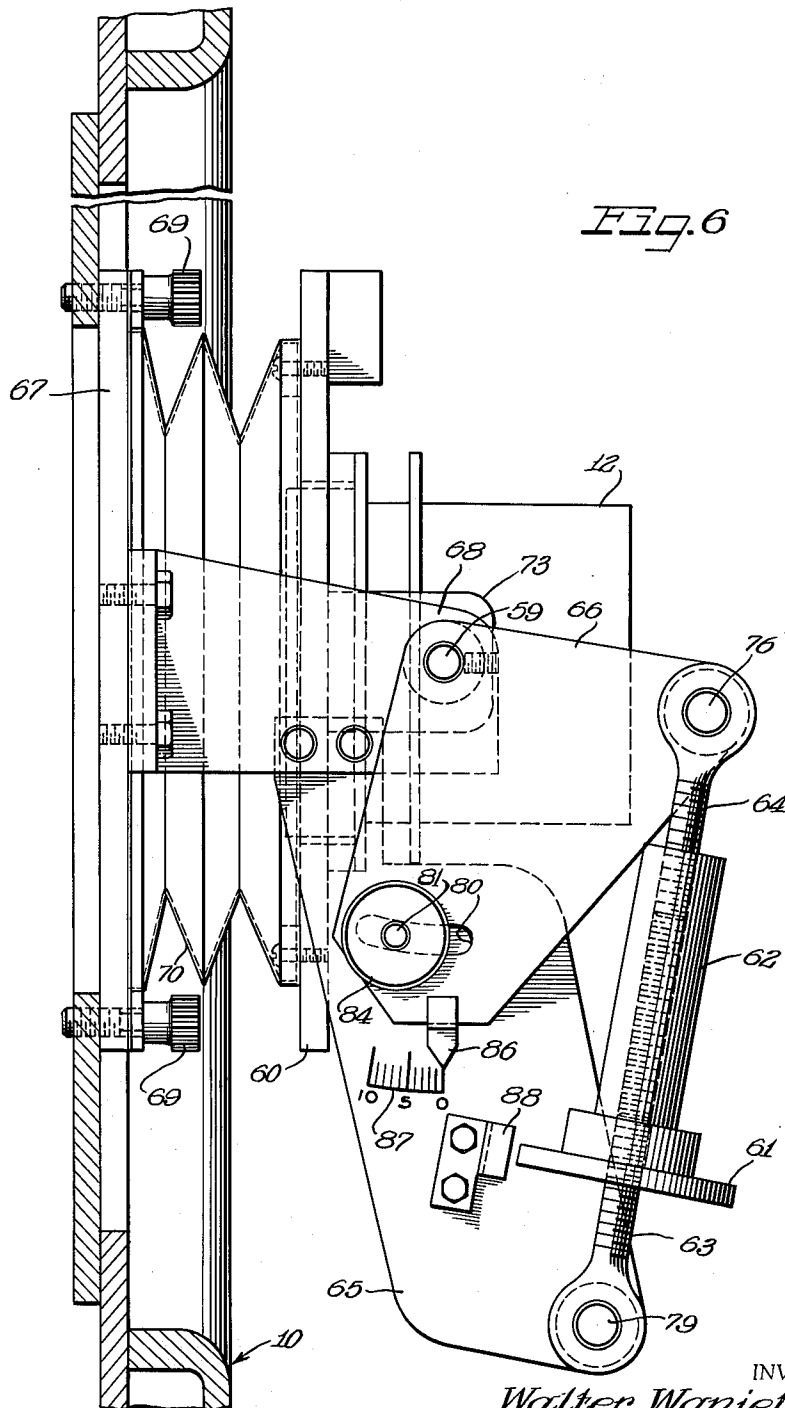
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6 Sheets-Sheet 4



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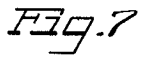
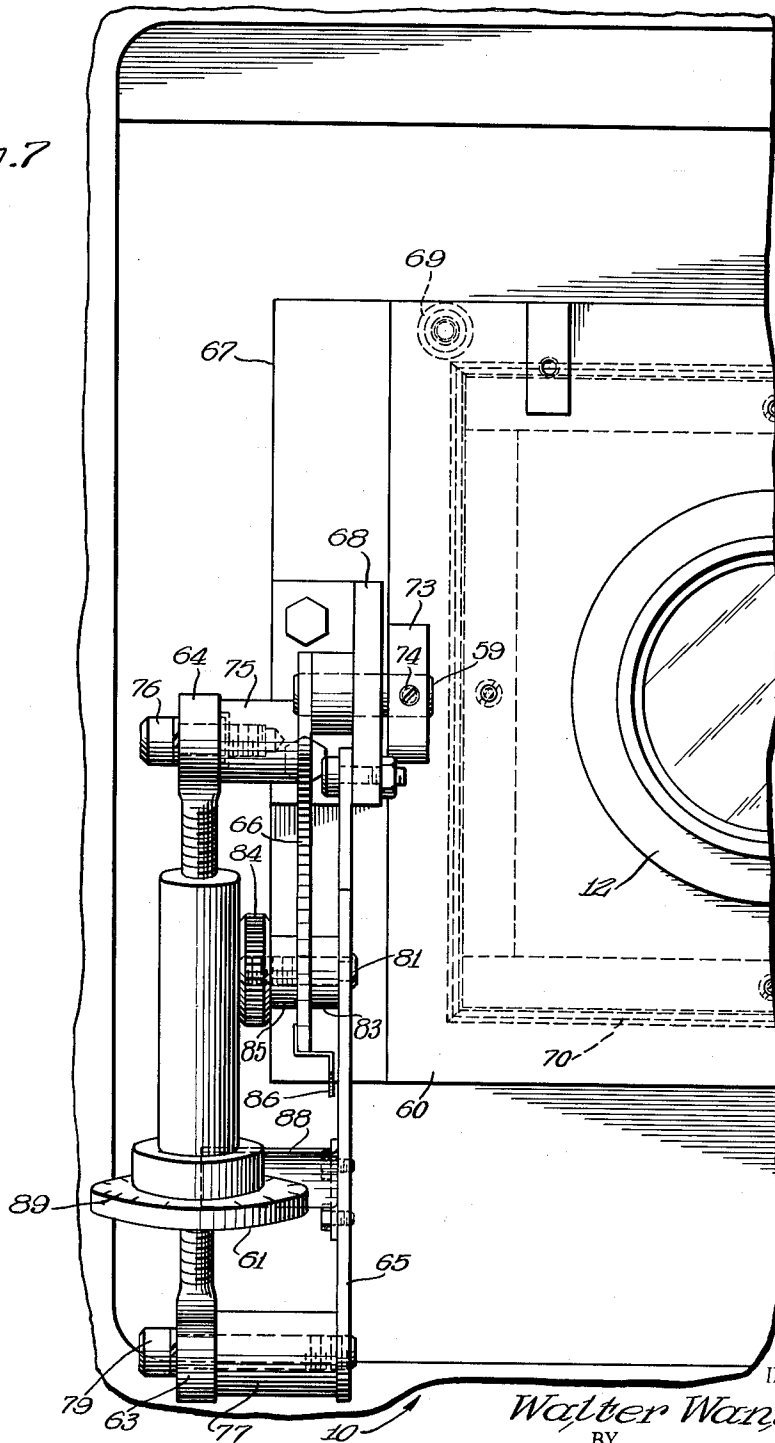
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6 Sheets-Sheet 5



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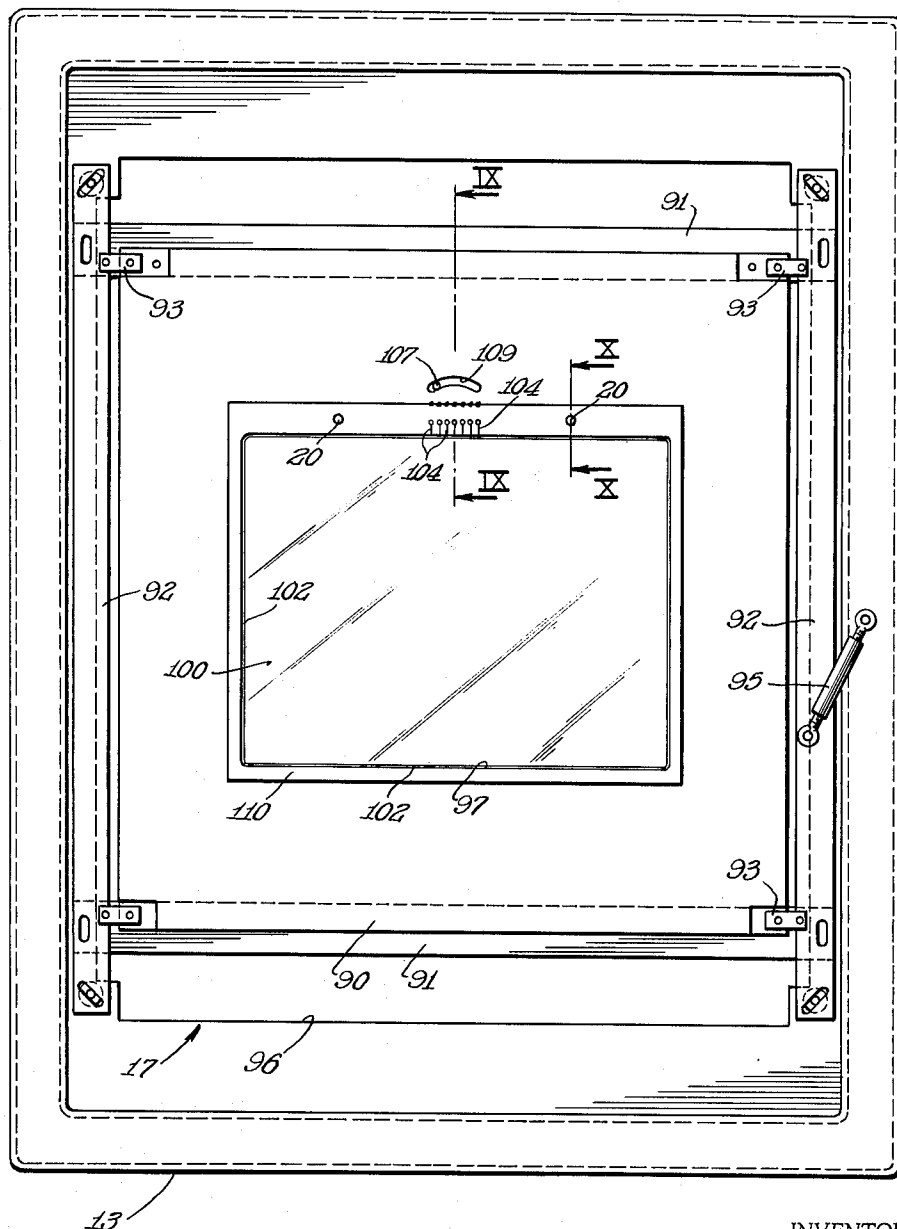
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6 Sheets-Sheet 6

Fig. 8



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METHOD AND APPARATUS FOR REPRODUCING A SUBJECT TO BE TRANSFERRED TO A RUBBER BLANKET FOR LETTERPRESS AND OFFSET PRINTING AND THE LIKE

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Filed Feb. 12, 1963, Ser. No. 258,034

5 Claims. (Cl. 88—24)

This invention relates to improvements in an apparatus for reproducing a subject to be transferred to a printing plate for letter press and offset printing and the like.

In printing from a rubber blanket printing plate in which the printing surface is offset from the body of the plate, where the blanket plate or other printing plate has an impression printed thereon and is curved about a blanket or press cylinder of a printing press, to transfer the impression to sheets of paper, the curving of the blanket about the cylinder distorts the impression, with a resultant imperfect printed impression on the paper. This occurs in all relief printing plates placed about press cylinders, including conventional forms of flexographic, rubber dry offset plates, and relief zinc and magnesium printing plates.

A principal object of the present invention, therefore, is to provide a novel, simple and improved apparatus correcting the distortion of the impression made by a rubber printing blanket or other offset printing plate caused by curving the plate about a press cylinder.

A still further object of the invention is to provide a simple apparatus for correcting the distortion of rubber blanket printing plates and other offset plates cause by curving of the plates about printing cylinders, comprising a holder for the subject to be impressed on the blanket with means for tilting the holder at an angle with respect to the vertical determined by the distortion of the image on the plate, together with separate means for tilting the lens of the camera at the same angle as the angle of the holder and locating means for the negative in the camera for accurately locating the negative with respect to the subject together with other locating means associated with the holder for the negative, accommodating the negative to be supported on the holder in an upside down position in accurate location with respect to the camera lens and negative, for reproducing the upside down negative when the lens and holder therefor are tilted at equal angles.

A still further object of the invention is to provide a simplified form of adapter kit for adapting graphic arts cameras and copyboards to compensate for the distortion of the impression on rubber blanket printing plates or other offset printing plates when curved about a printing cylinder.

These and other objects of the invention will appear from time to time as the following specification proceeds and with reference to the accompanying drawings wherein:

FIGURE 1 is a view in side elevation of a camera and copyboard assembly embodying the distortion correcting apparatus of the present invention;

FIGURE 2 is a diagrammatic view illustrating certain principles of the present invention and showing the positions of the lens and copyboard for making a first negative, and also the form of the impression on the first negative;

FIGURE 3 is a diagrammatic view illustrating the positions of the copyboard and film for taking a second negative and showing the impression on the final negative, to be used to transfer to a rubber blanket;

2

FIGURE 4 is an enlarged view in side elevation of the support and tilting means for the copyboard showing the copyboard supported thereon;

FIGURE 5 is a fragmentary front view of one side of the carriage for the copyboard showing the mechanism for tilting the copyboard, and showing the copyboard in broken lines;

FIGURE 6 is a fragmentary view in side elevation of the forward end portion of the camera showing the tilting mechanism for tilting the camera lens;

FIGURE 7 is a fragmentary front end view of the camera, looking at the lens and the tilting mechanism therefor;

FIGURE 8 is a front end view of the chase for mounting the distorted negative on the copyboard, to be re-photographed in an upside down position;

FIGURE 9 is a partial fragmentary sectional view taken substantially along line IX—IX of FIGURE 8 and drawn to an enlarged scale; and

FIGURE 10 is an enlarged fragmentary sectional view taken substantially along line X—X of FIGURE 8.

In the embodiment of the invention illustrated in the drawings, I have shown in FIGURE 1 a graphic arts camera 10, which may be a reflex camera, and is shown as being mounted at one end of a track 11 and as having a lens 12. I have also shown a copyboard 13 adjustably mounted on the track 11 for movement towards and from the lens 12 with its center in alignment with the optical center line of the lens 12. Lights 15 in front of the copyboard 13 and on opposite sides of the track 11 are provided to project light to illuminate a subject on the copyboard by reflection. I have further shown a light 16 for projecting light through the back of the copyboard through a chase 17 thereon and illuminating a negative carried by the chase for reproducing the negative by the camera.

When normally photoreproducing a subject, the subject to be reproduced is placed in the copyboard and the copyboard is positioned vertically with its center in alignment with the optical center of the lens. A film 14 then is placed in the camera and exposed and developed. The image on the negative will be of a size substantially like that diagrammatically shown by solid lines in FIGURE 3.

In accordance with the principles of the present invention, the film is punched as indicated by reference character 18 and the punched portions of the film are registered with pins 19 within the camera. This will accurately locate the film with respect to the copyboard. The copyboard is then rotated in a clockwise direction an amount determined by the distortion caused by the curving of the rubber blanket printing plate as placed on the press cylinder. The angle of tilt of the copyboard may usually be 10° from the vertical. The lens 12 may also be tilted with respect to the vertical in a clockwise direction at the same angle as the angle of the copyboard. The subject to be reproduced being placed on the copyboard 13 in centered relation with respect thereto is illuminated by reflection by the lights 15 and the film on the pins 19 is exposed by opening the lens shutter (not shown). The exposed film is then developed to produce a negative, and when developed the image on the negative will cover an area indicated by dotted lines in FIGURE 2.

The negative is then placed on the chase 17 and registered on pins 20, 20 on the chase. The chase is placed upside down on the copyboard when taking the second picture, so the top of the negative is at the top. A second film properly punched is then registered with the pins 19 in the camera. With the lens 12 and copyboard 13 tilted at the same angle as for the first exposure, the first negative is illuminated by the light 16 projecting light through the back of the copyboard and chase. The second film

is then exposed and developed. The width of the impression on the second film will be the same as the width of the impression on the first film, but the length of the impression on the second film will be equal to the length of the impression on the first film plus an additional amount indicated by D, the distance D equalling the amount of distortion of the image on the rubber blanket printing plate when curved about the blanket or impression cylinder of the printing press.

It may thus be seen that by the apparatus and system of the present invention, distortion of the impression placed on a rubber blanket by the curving of the blanket plate about a blanket or impression cylinder has been compensated for and that the blanket plate with the corrected impression thereon may readily be curved about its impression cylinder and print an impression on paper free from distortion.

Referring now in particular to certain detailed features of the invention, the copyboard 13 may be a conventional form of copyboard commonly used for copying subjects for impression on rubber blanket plates or other plates for printing, and includes a generally U-shaped carriage 23 mounted on the track 11 for adjustable movement therealong and having parallel spaced upstanding side arms 24 having the copyboard 13 pivotally mounted therebetween on trunnion pins 25, as shown in FIGURES 1 and 5, only one of said side arms and trunnion pins being shown herein. The copyboard 13 includes generally a cover or front section 26 and a back or base section 27. The trunnion pins 25, 25 extend laterally from opposite sides of the base section. The front section 26 is suitably hinged to the back section 27 to accommodate opening of the copyboard to place a subject to be reproduced in the copyboard, and has a glass plate (not shown) extending across the front thereof.

The back section may also have a glass plate (not shown) extending across the back thereof and may have a felt (not shown) mounted thereon upon which the chase or subject to be reproduced may be mounted. The felt may have an open central portion to accommodate the light 16 to project light through the back of the copyboard and illuminate a negative carried by the chase 17. The copyboard itself may be of any conventional form and is well known to those skilled in the art so need not herein be shown or described further.

Referring now in particular to the means for tilting the copyboard 13 when it is desired to correct for distortion caused by curving of a rubber blanket plate as placed on a blanket or impression cylinder, as shown in FIGURES 4 and 5, the right hand side arm 24 has a slot 30 therein opening toward the camera 10. The slot 30 is adapted to receive a hollow pin 31 extending inwardly from a pivot plate 32 pivotally mounted on the trunnion pin 25 (FIGURE 5). The pivot plate 32 has a boss or sleeve 33 extending inwardly of its upper end portion and abutting a boss 35 extending outwardly of the side arm 24. The bosses 33 and 35 space the pivot plate 32 outwardly of the side arm 24 to depend vertically from the pivot pin 25.

The sleeve or hollow pin 31 has a pin 36 extending therealong inwardly of the side arm 24 and adapted to have connection with the back section 27 of the copyboard 13. A knob 37 is mounted on the outer end of the pin 36. The pin 36 may be releasibly mounted in the sleeve 31 in a suitable manner (not shown) to accommodate release of the pin 36 from the back section 27 of the copyboard 13 when it is desired to move the copyboard to a horizontal position.

The pivot plate 32 has an arcuate slot 39 formed therein, the arc of which is struck from the center of the pin 25. A locking shaft 38 slidably extends through said slot and is threaded in a boss 40 extending outwardly of the side arm 24 and having slidable engagement with the inside of the pivot plate 32, at its outer side. A lock handle 43 is secured to the outer end of the lock shaft 41 for

turning said shaft within the boss 40 and locking the pivot plate 32 in fixed position when the angle of the copyboard has been properly set. When the copyboard is set at the proper angle, the pivot plate may be locked in a fixed position. The pin 36 may then be released to permit turning of the copyboard independently of the pivot plate and to be reset at the angle of the pivot plate by engaging the pin 36 with the copyboard.

The pivot plate 32 and copyboard 13 are tilted by a traverse nut 44 threaded on a screw 45 and connected with the pivot plate 32 by a link in the form of a turnbuckle 46. The traverse nut 44 is guided between guide plates 47 of a traverse guide 48. The traverse guide 48 consists of a base plate 49 mounted on the side arm 24 and extending thereacross and having the guide plates 47 suitably secured to opposite sides thereof and extending outwardly therefrom. End walls 50 and 51 close opposite ends of the guide plate 47 and form bearing supports for the screw 45. The screw 45 extends outwardly of the end wall 50 and has a hand wheel 53 mounted thereon for turning said screw and moving the traverse nut 44 along the guide 48. The turnbuckle 46 is pivotally mounted at one end on a pin 54 extending horizontally outwardly of the traverse nut 44 and is pivotally mounted on its opposite end on a pin 56 extending outwardly of the lower end portion of the pivot plate 32.

The base plate 49 has a counter 55 mounted thereon connected with the threaded shaft 45 through a coupling 57. The counter is provided to count the revolutions and partial revolutions of the shaft 45 required to tilt the pivot plate 32 and copyboard 13 at a selected angle, to enable the operator to determine the angle of tilt of the copyboard and to tilt the copyboard at the same angle each time the board is positioned to correct distortion.

The lens 12 is tiltable about the axis of laterally spaced coaxial transverse pivot pins 59 forming mounting for a lens mounting plate 60 and coaxial with the horizontal center line of the lens. A dial 61 is provided to tilt the lens. The dial 61 is secured to an internally threaded sleeve 62 having connectors 63 and 64 threaded in opposite ends thereof.

The internally threaded sleeve 62 and connectors 63 and 64 form in effect a turnbuckle connecting a stationary plate 65 depending from the lens mounting plate 60 with a movable lock plate 66 suitably secured to the pin 59 for tilting the lens upon turning of the dial 61.

The mountings for the pivot pins 59 on each side of the lens plate are the same, so one side only need therein be shown or described. As shown in FIGURES 6 and 7, the pivot pins 59 are mounted in laterally spaced brackets 68 secured to and extending outwardly of a mounting plate 67. The mounting plate 67 is mounted on the front of the camera by thumb screws 69 which also mount a bellows assembly 70 to the front of the camera to extend forwardly therefrom.

The lens mounting plate is spaced in advance of the mounting plate 67 and is connected with the lens bellows assembly through the bellows of the assembly and has the lens 12 mounted thereon in a conventional manner. The lens mounting plate 60 has spaced ears 73 projecting forwardly therefrom and mounted on the pivot pins 59 and connected thereto as by set screws 74 (FIGURE 7).

As shown in FIGURE 6, the lock plate 66 extends forwardly of the pivot pin 59 and has a boss 75 extending outwardly therefrom abutted by the inside of the connector 64 and forming a mounting for a pivot pin 76 for said connector. The stationary plate 65 also has a hub or boss 77 extending outwardly of its lower end portion and abutting at its outer end the inside of the connector 63 and spacing the axes of the connectors 63 and 64 and sleeve 62 parallel to the plate 65. The boss 77 forms a mounting for a pivot pin 79 pivotally connecting the connector 64 to the plate 75.

The lock plate 66 is shown in FIGURE 6 as having an arcuate slot 80 formed therein, the arc of which is struck

5

from the axis of the pivot pin 59. A pin 81 is mounted in the stationary plate 65 and extends outwardly therefrom through a hub or boss 83 and through the arcuate slot 80. The outside of the boss 83 abuts the inside of the lock plate 66.

A lock knob 84 has a hub 85 formed integrally therewith and threaded on the pin 81 and abutting the outside of the lock plate 66 to lock said plate in position upon turning of the knob 84. The lock plate 66 has a pointer 86 depending therefrom registering with indicia 87 in the stationary plate 65, to indicate the degree of tilting of the lens 12.

A pointer 88 is also mounted on the stationary plate 65 and registers with indicia 89 on the dial 61 to enable the position of said dial to be ascertained with respect to the angle of tilt of the lens 12 and to provide a base enabling the dial to be turned back to the same position each time the lens 12 is tilted.

The chase 17 is in the form of a vacuum frame constructed along lines similar to those shown and described in United States Patent No. 3,028,786 granted to Walter Wanielista and Daniel Franklin Keller on April 10, 1962, so need only herein be shown and described in sufficient detail to render the present invention readily understandable.

The chase 17 is diagrammatically shown in FIGURE 3 as being mounted on the base frame or back section of the copyboard and generally includes a vacuum plate board 90 adjustably mounted on horizontally extending bars 91, 91 adjacent the top and bottom of the copyboard and on spaced upright bars 92, 92 extending along opposite sides of the copyboard. The vacuum plate board 90 is mounted on the upright bars 92, 92 in registry with an open portion 94 of the base frame of the copyboard on links 93, 93. A turnbuckle 95 is connected between the base frame for the copyboard and an upright bar 92 to center the vacuum plate board 90 with respect to the optical center of the lens and a central opening 96 of the copyboard prior to positively securing the chase in place on the copyboard. Thumb screws 94, 94 (FIGURE 9) are provided to lock the links 93 in position and to thereby lock the chase in centered relation with respect to the copyboard.

The vacuum plate board 90 has a central rectangular opening 97 therein (FIGURE 10) having a rectangular shoulder 99 extending outwardly therefrom and forming a recess for a glass plate 100 which may be in the form of a clear glass plate. The glass plate 100 is sealed to the margin of the opening 97 as by sealing putty 101. The plate 100 has a peripheral edge spaced from rectangular walls defining the outer margins of the shoulder 99, and forming a peripheral vacuum passageway 102 extending about the margin of the glass plate 100. Vacuum is supplied to the passageway 102 through suitable valve means (not shown) in a valve block 103 at the back of the glass 100 (FIGURE 10). The valve block 103 has communication with a plurality of slots or passageways 104 leading to the peripheral passageway 102. The valve block 103 has a vacuum input (not shown) which may be connected with a suitable source of vacuum in a conventional manner.

As shown in FIGURE 9, a pin 105 extends outwardly of the valve block 103 and has an arm 106 secured thereto. The arm 106 has an operating pin 107 extending perpendicular thereto through an arcuate slot 109 formed in the vacuum board 90 to accommodate operation of the valve from the outer side of the vacuum board. The valve itself may be of any well known form and is no part of the present invention so need not herein be shown or described further.

The vacuum board 90 also has suitable masking 110 extending about the periphery of the glass 100 and has the spaced pins 20, 20 extending outwardly therefrom and corresponding to the spacing of the pins 19, 19 on the back of the camera for registry with the holes 18, 18

6

in the film to exactly register the film in the same position on the chase as in the camera, and to thereby accommodate the duplication of the subject on the first film as the position of the negative from the first film is placed upside down and the image on the negative is illuminated by the projection of light through the negative from the back of the copyboard by the light 16, as shown in FIGURES 1 and 3.

During operation of the apparatus when correcting for distortion of an image to be impressed on a rubber blanket an unexposed film 14 is placed in the camera in registry with the pins 18, 18. The copyboard 13 is then tilted in accordance with the distortion of the image on a printing plate when placed about the impression cylinder, which may be at an angle of 10°. The lens is also tilted at an angle of 10° by operation of the dial knob 61. The subject to be photographed being placed on the copyboard and held thereto by vacuum or by the pressure of the glass of the cover section 26, the film is exposed and developed and printed. The image on the negative, assumes the form indicated by the dotted lines in FIGURE 2.

The chase 17 being mounted on the base frame of the copyboard, with the pins 20, 20 in an up position, the copyboard is rotated 180°, positioning the chase upside down with the pins 20 in the lowermost position shown in FIGURE 3. The developed film is then placed on the pins 20, 20 and when so placed will be upside down from the position of the subject when photographed by the camera and is held to the chase by vacuum. Light is then projected by the light 16 through the opening 96 in the base frame of the copyboard and through the negative carried on the pins 20, 20 of the chase. A second film is then mounted in the camera on the pins 19, 19 and thus accurately located in the camera with respect to the negative carried by the chase on the pins 20, 20. The second film is then exposed and developed. The width of the impression will be the same as the width of the original impression on the film, but the length of the impression will be the length of the original impression on the first film plus an additional distance D determined by the distortion of the image on a rubber blanket printing plate or other offset printing plate when placed on the impression cylinder.

While I have herein shown and described one form in which my invention may be embodied, it may readily be understood that various variations and modifications in the invention may be attained without departing from the spirit and scope of the novel concepts of the invention.

I claim as my invention:

1. A graphic arts assembly for correcting the distortion of printing plates caused by curving of the plate about a printing cylinder comprising a frame, a camera at one end of said frame having a lens tiltable about an axis extending transversely of and intersecting its optical center, means in the camera engageable with the film for accurately locating the film in the focal plane of the lens of the camera, a copyboard on said frame in spaced relation with respect to said lens and having means on one side thereof for holding the subject to be photographed and means on the opposite side thereof engaging a negative for accurately locating and holding the negative of the subject photographed in the same relation as the subject, means for tilting said copyboard at an angle sufficient to compensate for the distortion caused by curving of the plate about its printing cylinder, means for tilting said lens at the angle of tilt of said copyboard, said copyboard being rotatable about an angle of 180° to position said means at the back of said copyboard to face the lens of the camera and being open in the center thereof to accommodate the projection of light through a negative on said locating means.

2. A graphic arts assembly for correcting the distortion of printing plates caused by curving the plate about a printing cylinder comprising a frame, a camera at one

end of said frame having a tiltable lens and having means therein, means, in the camera engageable with a film for accurately locating the film in the focal plane of the camera, a tiltable copyboard mounted on said frame and having means at one side thereof for holding a subject to be photographed and having locating means at the opposite side thereof engageable with a negative of the subject photographed for accurately locating the negative with respect to the optical center line of the camera, means for tilting said copyboard at the angle required to correct for distortion caused by curving of the plate about its printing cylinder, means for tilting said camera lens at the angle of tilt of the copyboard, means illuminating the subject to be photographed on said copyboard by reflection, said copyboard being rotatable about an angle of 180° to position a negative on said locating means in fixed relation with respect to a film located on said camera and having an open portion accommodating the projection of light therethrough, and means projecting through said open portion of said copyboard.

3. A graphic arts assembly for correcting the distortion of offset printing plates caused by curving of the plate about a printing cylinder comprising a frame, a camera at one end of said frame, a lens for said camera, means mounting said lens for tiltable movement about an axis extending transversely of an intersecting the optical center of said lens, said camera also having locating pins therein locating a film in the focal plane of said lens, a copyboard mounted on said frame in spaced relation with respect to said camera for tilting movement about an axis extending transversely of said frame, said copyboard having a front cover section openable to accommodate the mounting of a subject to be photographed in said copyboard and having a back frame, a chase mounted on said back frame and having pins thereon in the same spacing with respect to the optical center of the camera as the pins in said camera for accurately locating a negative with respect to a film located on said pins in said camera, said copyboard also having an open central portion to accommodate the projection of light through a negative located on said pins on said chase, means for tilting said copyboard at an angle determined by the stretch of said blanket when placing said blanket about a printing cylinder, means for holding said copyboard in its tilted position, means for tilting said lens at the angle of tilt of said copyboard and means for holding said lens at the angle of tilt of said copyboard.

4. A graphic arts assembly for correcting the distortion of offset printing plates caused by curving of the plate about a printing cylinder comprising a frame, a camera at one end of said frame, a lens for said camera, means mounting said lens for tiltable movement about an axis extending transversely of and intersecting the optical center of said lens, said camera also having locating pins therein locating a film in the focal plane of said lens, a copyboard mounted on said frame in spaced relation with respect to said camera for tilting movement about an axis extending transversely of said frame, said copyboard having a front cover section openable to accommodate the mounting of a subject to be photographed in said copyboard and having a back frame, a chase mounted on said back frame and having pins thereon in the same spacing with respect to the optical center of the camera as the pins in said camera for accurately locating a negative with respect to a film located on said pins in said camera, said copyboard also having an open central portion to accommodate the projection of light through a negative located on said pins on said chase and being rotatable through an angle of at least 180° to bring a subject on said chase to face said lens in an upside

down position, a pivot plate pivoted for movement about the axis of pivotal movement of said copyboard, a pin releasably connecting said pivot plate with said copyboard, a traverse guide having a screw extending therealong, a traverse nut guided in said guide and threaded on said screw, a link connecting said nut with said pivot plate, and means for locking said pivot plate in position to accommodate release of said pin and accommodate turning of said copyboard free from said pivot plate, and to engage said pin with said copyboard to position said copyboard in the same location at the termination of changing the position of said copyboard independently of said pivot plate.

5. A graphic arts assembly for correcting the distortion of the images of offset printing plates caused by curving of the plate about a printing cylinder comprising a frame, a camera at one end of said frame, a lens for said camera, means mounting said lens for tiltable movement about an axis extending transversely of and intersecting the optical center of said lens, said camera also having locating pins therein locating a film in the focal plane of said lens, a copyboard mounted on said frame in spaced relation with respect to said camera for tilting movement about an axis extending transversely of said frame, said copyboard having a front cover section openable to accommodate the mounting of a subject to be photographed in said copyboard and having a back frame, a chase mounted on said back frame and having pins thereon in the same spacing with respect to the optical center of the camera as the pins in said camera for accurately locating a negative with respect to a film located on said pins in said camera, said copyboard also having an open central portion to accommodate the projection of light through a negative located on said pins on said chase and being rotatable through an angle of at least 180° to bring a subject on said chase to face said lens in an upside down position, a pivot plate pivoted for movement about the axis of pivotal movement of said copyboard, a pin releasably connecting said pivot plate with said copyboard, a traverse guide having a screw extending therealong and a traverse nut threaded thereon and guided for movement along said traverse guide, a link connecting said traverse nut with said pivot plate to tilt said copyboard upon rotation of said screw, means locking said pivot plate in position, means for tilting said lens at the angle of tilt of said copyboard comprising traverse pivot pins supporting said lens for tilting movement, means securing said lens to at least one of said pivot pins, a lock plate secured to said pivot pin, a stationary plate secured to the camera, an extensible link connecting said lock plate to said stationary plate, a dial for extensibly or retractibly moving said link, and thereby tilting said lens, and means for locking said lock plate in stationary relation with respect to said stationary plate and thereby locking said lens in tilted position to correspond to the tilt of said copyboard.

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