June 25, 1957 P. L. HEESTAND 2,796,831

PRINTING SCREEN REGISTERING DEVICE

Filed Oct. 12, 1954 2 Sheets-Sheet 1

Fig. 1

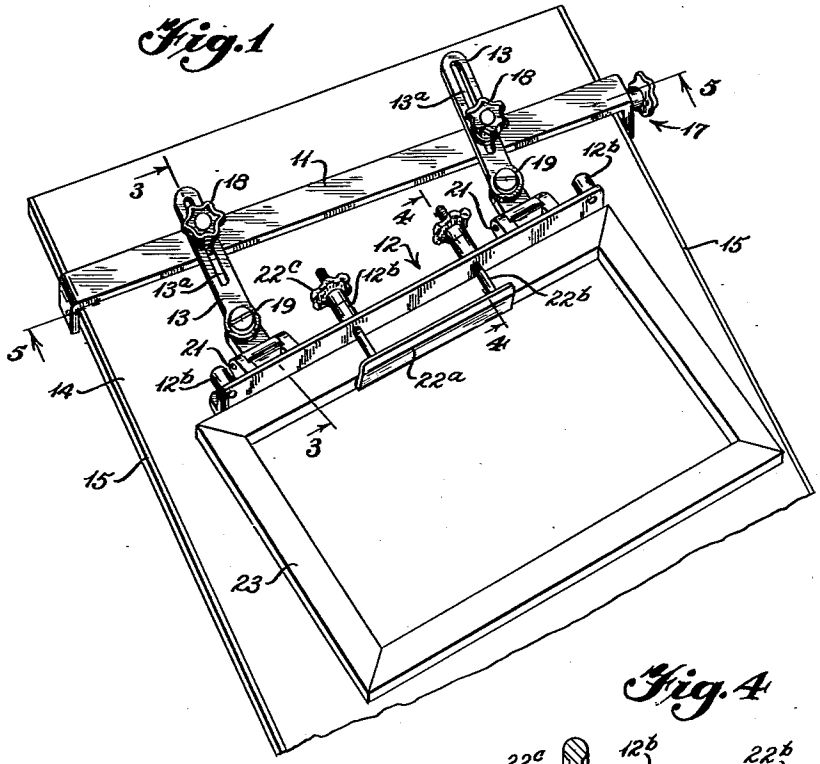


Fig. 4

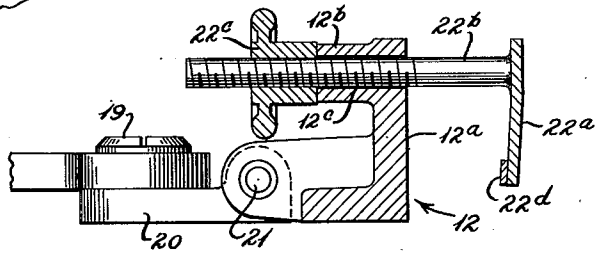


Fig. 5

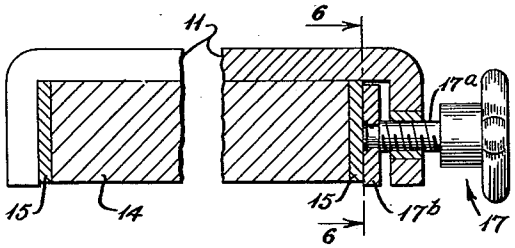
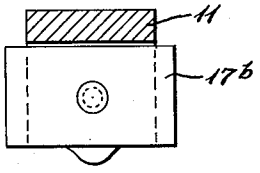


Fig. 6



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June 25, 1957 P. L. HEESTAND 2,796,831

PRINTING SCREEN REGISTERING DEVICE

Filed Oct. 12, 1954 2 Sheets-Sheet 2

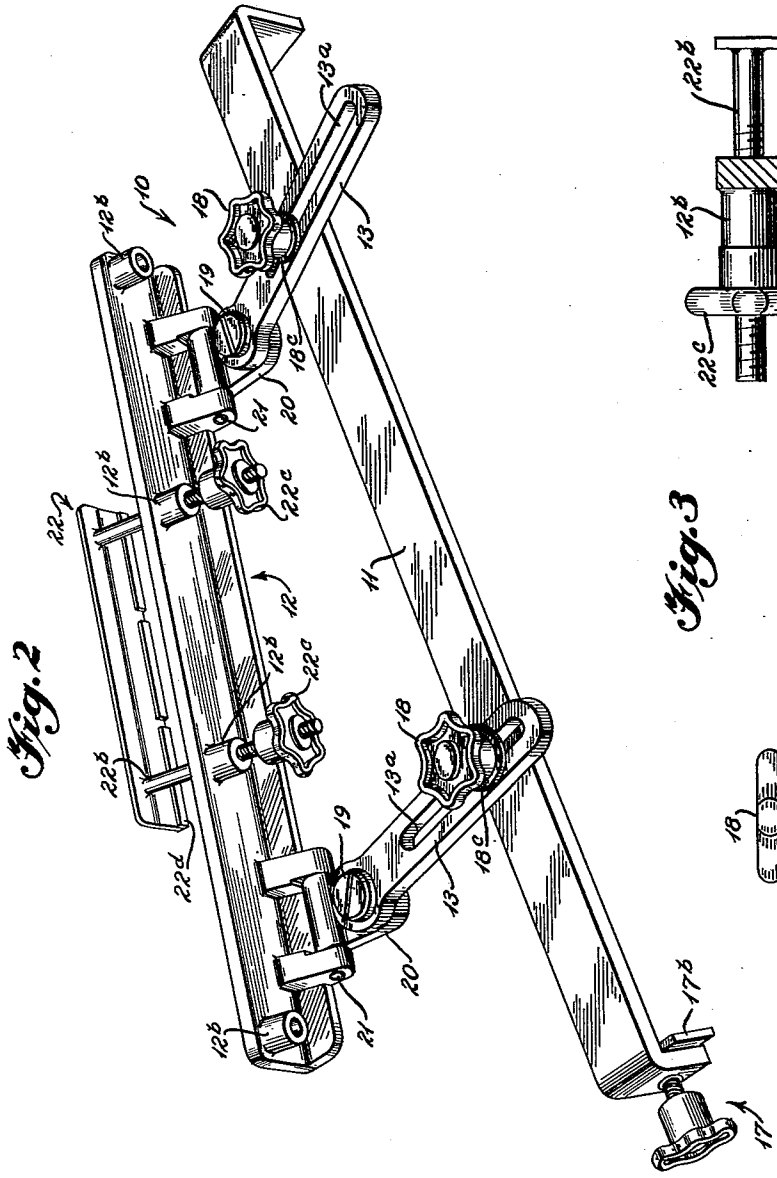


Fig. 2

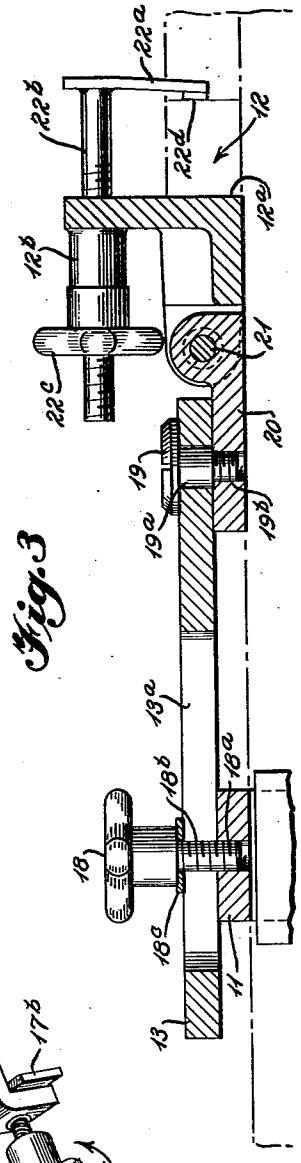


Fig. 3

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PRINTING SCREEN REGISTERING DEVICE

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Application October 12, 1954, Serial No. 461,754

3 Claims. (Cl. 101—126)

This invention relates to apparatus for use in the method of printing known as the "silk screen" process, and more particularly to a device for registering a printing screen on a table or bed plate for repeatedly printing a pattern in exactly the same registered position on successive sheets of paper or the like.

In the silk screen printing process a stencil is used comprising a pattern on a screen which is stretched across a rectangular frame. In the usual hand-operated apparatus, the screen is mounted on hinges attached to the top of the printing table. A sheet of paper to be imprinted is placed upon the table top and the hinged screen is swung down upon it with the screen in contact with the paper. Ink is then placed on top of the screen and forced through the screen by a squeegee. The screen is then lifted about its hinges, the sheet of paper removed and the operation is repeated on successive sheets. Each sheet may be printed in several colors, each color requiring a separate screen stencil and a separate printing operation.

One of the problems which must be solved in screen printing is to obtain exact registration so that each sheet will be printed in exactly the same areas. Exact registration is especially important where a plurality of impressions are to be made upon each sheet, as in printing a plurality of colors. The stencil pattern must be in exact registry not only in its position lengthwise of the printing table and transversely of it, but it must be oriented correctly, that is, it must be twisted at the correct angle with respect to the sides of the table. Screen printing frames vary considerably in size. For the foregoing reasons, it is necessary to make adjustments every time a printing frame is changed so as to have the screen registered correctly with respect to the position of the sheets for the next run. In practice, this requires frequent shifting of clamps and spacers. Often the position of the hinges must be changed. These adjustments are awkward to make and are time-consuming with conventional equipment.

One of the objects of this invention is to provide improved apparatus for screen process printing. Another object is to provide improved means for handling a wide variety of sizes of screen printing frames. Another object is to provide apparatus in which a screen may be quickly clamped onto a hinged mount or holder and the frame then moved universally on the table, while the screen remains parallel to and adjacent the printing surface of the table, to a desired register position and clamped firmly in this position for the printing operation. Other objects will become apparent from the following description and drawings in which:

Figure 1 is a view in perspective showing a preferred embodiment of my invention viewed from the front mounted on the top of a printing table or bed plate and holding a screen printing frame in registered position.

Figure 2 is a view in perspective of the same embodiment removed from the table and viewed from the rear.

Figure 3 is a fragmentary view in section taken along line 3—3 of Figure 1, portions of the bed plate and screen printing frame being indicated in broken lines.

Figure 4 is a fragmentary view in section taken along line 4—4 of Figure 1.

Figure 5 is a fragmentary view in section taken along line 5—5 of Figure 1.

Figure 6 is a view in section taken along line 6—6 of Figure 5.

Referring now to the drawing, in which like characters indicate similar parts, there is shown a screen printing frame registering device according to my invention, generally designated **10**, comprising a clampable cross bar **11**, a hinged mounting bar designated **12**, and adjustable links **13—13** connecting bar **11** and bar **12**. Figure 1 shows the device mounted on a printing table or bed plate **14** which preferably has metal edge-reinforcing strips **15—15**, one on each side. At each end cross bar **11** has a short portion bent at right angles to embrace the edges of table **14** as shown in Figure 5. By means of a clamp designated **17**, comprising a turnbolt **17***a* threaded in one downturned end of bar **11** and a swiveled pad **17***b* bearing against one of the strips **15**, bar **11** may be clamped in a desired position along the length of the table top or bed plate. Strips **15** thus coact with clamp **17** and the bent end portions of bar **11** in the clamping action. Threadedly mounted in bar **11**, as at **18***a* in Figure 3, are a pair of turnbolt clamps **18—18**. As indicated in Figure 3, the shank or pin portions **18***b* of these turnbolts extend freely through elongated slots **13***a* of links **13**. When clamps **18** are slightly unscrewed, links **13** are free to slide and rotate with respect to the portions **18***b* of turnbolts **18**. When clamps **18** are screwed down tightly against washers **18***c*, links **13** are held securely in position with respect to bar **11**.

At the front end of each link **13**, as best shown in Figure 3, there is an aperture **19***a* through which a pin **19** extends. Each pin **19** is threadedly secured in a hinge leaf **20** as indicated at **19***b*. The heads of pins **19** do not bind links **13** against hinge leaves **20**, links **13** and leaves **20** being free to swing relative to each other about pins **19** when clamps **18** are released. Hinge leaves **20—20** are hingedly mounted upon bar **12** by hinge pins **21—21** which have a common axis. It will be observed that the separate hinge leaves **20—20** may be joined by a bar or the like if desired without changing the essential character or operation of the device, but the illustrated arrangement minimizes interference with the novel screen clamping means **22** described below.

As will be seen from the foregoing description and drawing, bar **11** may be clamped in selected position on the top of printing table or bed plate **14** by means of clamp **17**. With clamps **18** loosened, so that links **13** are free to slide and rotate with respect to pins **18***b*, screen mounting bar **12** may be moved universally parallel to the plane of the top or printing surface of the bed plate **14** to a desired position in registry for the printing operation. In this position mounting bar **12** may be pivotally moved about hinge axis **21—21** so as to raise and lower the screen frame. As best seen in Figures 3 and 4, hinged mounting bar **12** has a flat surface **12***a* which is vertically disposed when the bar is in the downward or printing position illustrated in Figures 3 and 4. On the back of bar **12** are a plurality of bosses **12***b* with apertures extending through the bar **12** from front to back as best seen at **12***c* in Figure 4. The plurality of apertured bosses **12***b* provide means for attachment suitable screen clamping means such as is illustrated and generally designated **22**. In the illustrated embodiment, only one such clamp **22** is shown utilizing only the two central apertured bosses **12***b*. However, a longer clamp may be used extending the full length of mount **12** and utilizing the bosses **12***b* at each end, or two clamps of the same size as illustrated at **22** may be used, each using a pair of clamps adjacent one end of bar **12**.

As best shown in Figure 4, clamp **22** comprises a jaw **22***a* fixedly secured as by welding to the ends of two threaded bolts **22***b* which extend through apertures **12***c*. A nut **22***c* on the threaded outer end of each bolt **22***b* provide means for drawing jaw **22***a* toward surface **12***a* of bar **12**. Strips **22***d* are provided along the lower inner edge of jaw **22***a*. A screen frame **23** may be clamped between the surface **12***a* of mounting bar **12** and jaw **22***a* of clamp **22**. Jaw **22***a* is a comparatively thin plate and it constitutes a stiff spring jaw. Also, as clearly shown in Figures 3 and 4, the lower portion of jaw **22***a* when relaxed is inclined slightly inwardly toward clamping surface **12***a*. In Figure 3 a fragmentary part of a screen frame is indicated in broken lines as being lightly engaged by strips **22***d*, with plate **22***a* in relaxed position. Although other forms of movable clamping jaws may of course be used, this combination of spring jaw **22***a* with its strips **22***d* coacting with fixed jaw surface **12***a* has been found very effective for a quick clamping of screen frames. It will be observed that mounting bar **12** and screen frame clamp **22** combine to form a screen frame mount **12—22** which is hingedly mounted to the remainder of the device by hinge means **20—20** and **21—21**.

In operation, a screen printing frame is clamped to mounting bar **12** by clamp **22** in the manner described. With clamp **17** released and clamps **18** tightened bar **11** is then moved along the surface of the bed plate **14** to bring the screen frame **23** into approximate position for printing. Clamp **17** is then clamped and clamp members **18—18** loosened. Frame **23** is then moved into exact registry position, the slotted links **13** and pins **19** permitting universal movement of the frame **23** in a plane parallel to the top of bed plate **14**. Turnbolts **18** are then tightened. This firmly fixes hinge leaves **20—20** with respect to the bed plate **14** and registers the frame **23** and mount **12—22** in the desired position. By means or marks not shown each successive sheet to be imprinted is registered on bed plate **14**. Mount **12—22**, carrying frame **23**, is rotated about hinge pins **21—21** for the printing operation, always returning to the exact registered position when lowered.

It will be apparent to those skilled in the art that I have provided an improved printing screen registering device which is of simple and rugged construction, which is well adapted for quick and accurate adjustment to any desired registry position of the screen, and which can quickly accommodate different screen frames which vary widely in size.

Although only one embodiment of my invention has been described, various other embodiments within the spirit of the invention as defined by the appended claims will be apparent to those skilled in the art. As examples, and without limitation, other suitable adjustable linkage may be used between bed plate **14** and hinge means **20—20**. Bar **11** may be eliminated and turnbolts **18** threadedly mounted in suitable sockets fixed in bed plate **14**, the slotted links in this case being somewhat longer to provide for adequate adjustment of the device lengthwise of bed plate **14**. As another example, other frame clamping means may be substituted for the illustrated clamping means **22**.

I claim as my invention:

1. In combination with a printing table having a printing surface and parallel longitudinal edges, a movable cross bar clampable to said table, spaced upstanding pins mounted on said cross bar, an adjustable link for each of said pins connected respectively thereto for sliding thereon and rotating thereabout parallel to said printing surface, register clamping means for clamping each of said links in selected fixed position on said cross bar, a screen frame mount having means for clamping a screen frame thereto, hinge means attached to said mount having hinge leaves mounted on a hinge axis parallel to said printing surface, and spaced pivots perpendicular to said printing surface one for each of said adjustable links each pivotally connecting one end of its adjustable link with one of said hinge leaves, whereby a screen frame may be clamped to said screen frame mount, moved universally parallel to the printing surface, and said mount clamped in a selected position on said table free for rotation about said hinge axis.

2. In combination with a printing table having a printing surface and parallel longitudinal edges, a hinged printing screen holding and registering device comprising a movable cross bar on said table extending across said longitudinal edges, position clamping means for clamping said cross bar in selected position on said table, spaced upstanding pins mounted on said cross bar, a slotted link for each of said pins each having a longitudinal slot slidably surrounding its respective pin for sliding thereon and rotating thereabout parallel to said printing surface, register clamping means for clamping each of said links in selected fixed position on said cross bar, vertical pivots one for each of said adjustable links and each mounted adjacent an end of a different one of said adjustable links, hinge leaves one for each of said vertical pivots and mounted respectively thereon for free movement thereabout, a screen frame mounting bar hingedly mounted on said hinge leaves by aligned hinge pins having a hinge axis parallel to said printing surface, said mounting bar having a surface opposite said hinge leaves for engaging the outer surface of one side of a screen frame to be clamped, and a frame clamp having a jaw for engaging the inner surface of said side of a screen frame to be clamped, rods fixed to said jaw extending through said frame mounting bar and frame clamping means for drawing said rods through said mounting bar to clamp said screen frame to said mounting bar, whereby a screen printing frame may be clamped to said screen frame mounting bar, said position clamping means and said register clamping means loosened, said screen frame moved to selected position along the surface of said printing table and oriented at a selected angle relative to said longitudinal edges, said position and register clamping means tightened, and said screen printing frame raised and lowered from and to the selected register position.

3. A hinged printing screen registering device for registering a printing screen in selected position on a bed plate and maintaining it securely in said position during hinged printing operations, comprising a screen mount, screen frame clamping means for detachably clamping a screen frame to said mount, a pair of laterally spaced hinges on said mount for swinging said screen frame about a hinge axis parallel to said bed plate, each said hinge having a leaf with a pivot perpendicular to said bed plate, a link for each said pivot pivotally attached at one end to said respective pivot, and a pair of laterally spaced means slidably and swingably engaging said respective links supported by said bed plate for immovably securing said links independently in predetermined positions, whereby a screen frame may be clamped to said screen frame mount, moved universally parallel to said bed plate, and said mount clamped in a selected position on said table free for rotation about said hinge axis.

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