

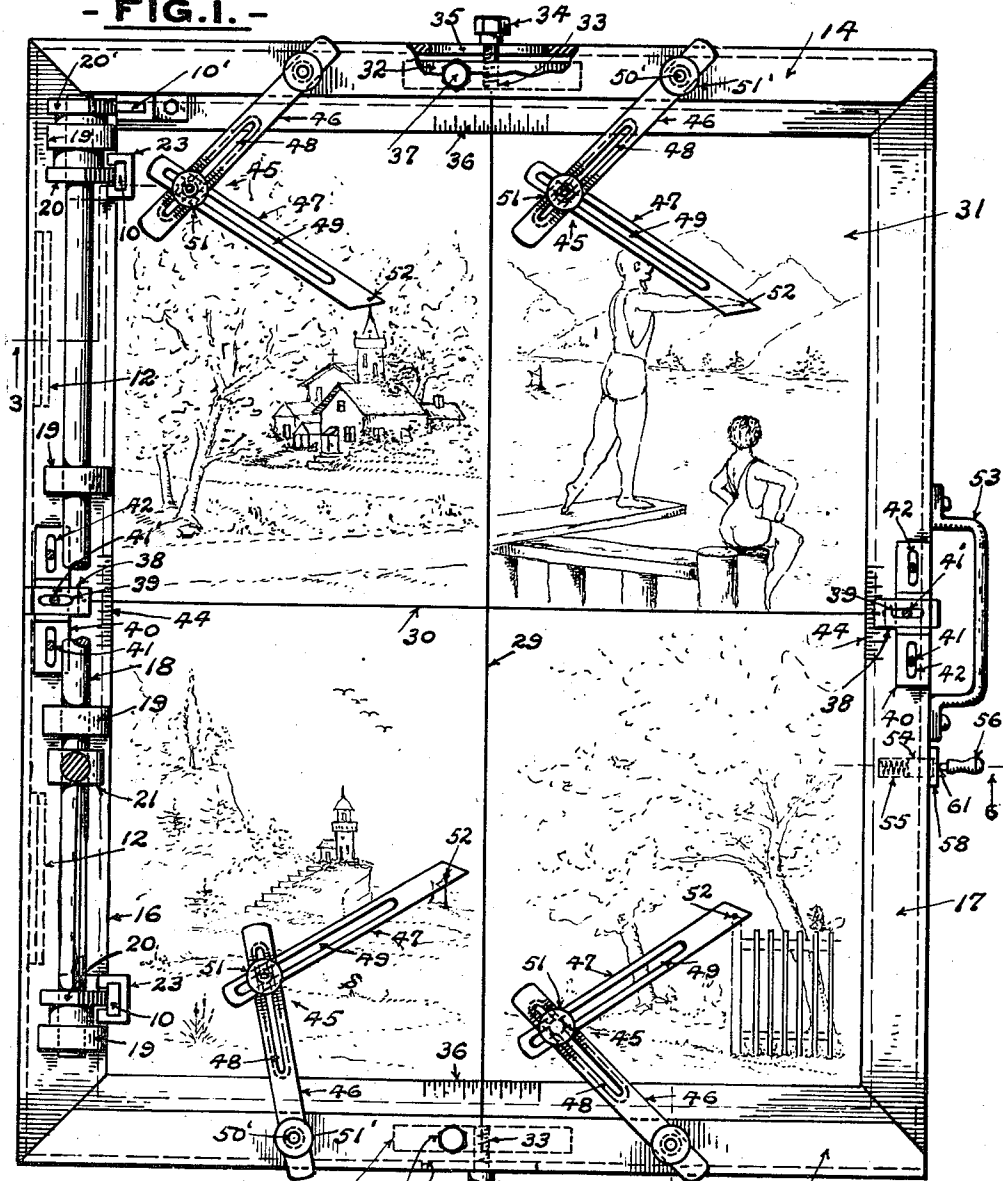
Aug. 20, 1935.

A. L. LENGEL ET AL  
METHOD AND MEANS FOR PREPARING STEREOTYPE  
MATRICES FOR MULTICOLOR PRINTING  
Filed Dec. 24, 1931

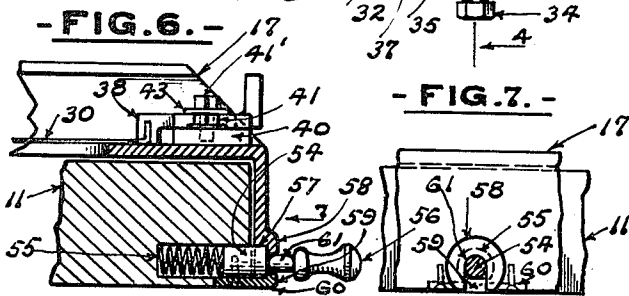
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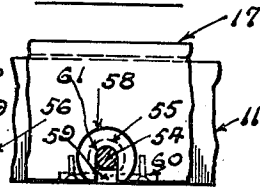
- FIG. 1. -



- FIG. 6. -



- FIG. 7. -



INVENTORS

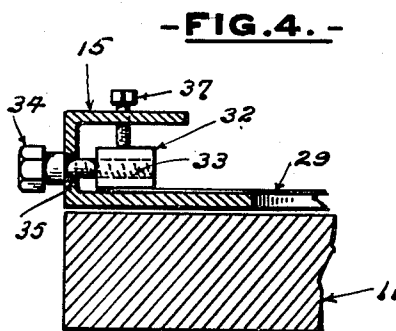
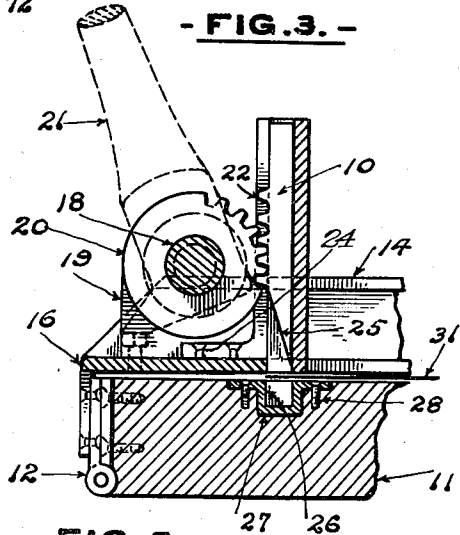
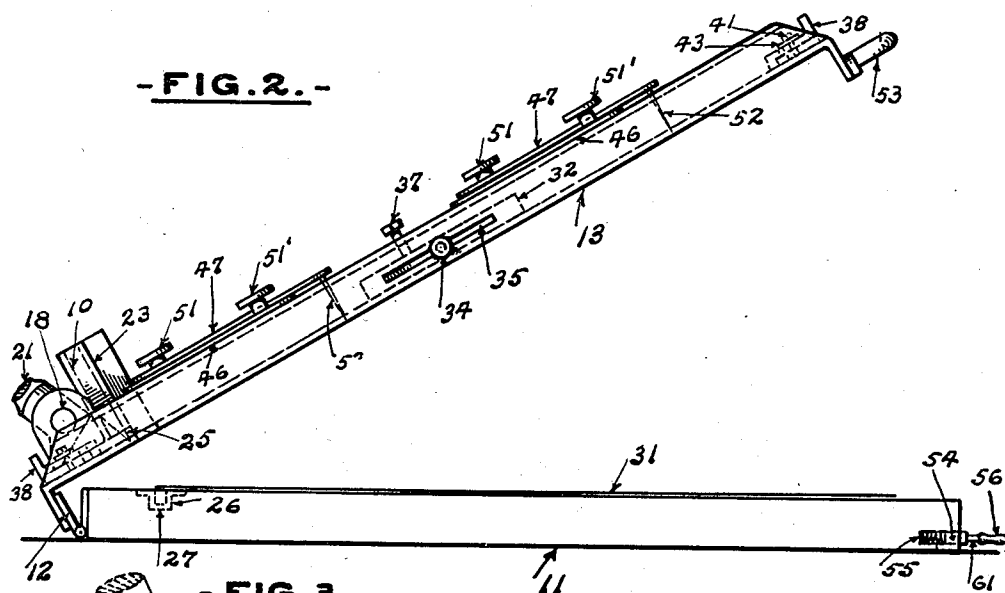
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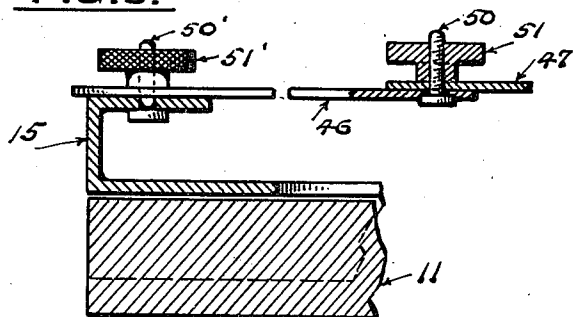
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**- FIG. 5. -**



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## UNITED STATES PATENT OFFICE

2,011,584

METHOD AND MEANS FOR PREPARING  
STEREOTYPE MATRICES FOR MULTI-  
COLOR PRINTING

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8 Claims. (Cl. 33—184.5)

This invention in general relates to devices employed in multi-color printing, having for its object the provision of a device particularly designed and adapted to insure the correct trimming of a series of matrices for use in the casting of plates so that the latter can be secured in correct register on the printing cylinder for the printing of the several colors required in corresponding register.

Another object is to provide a novel register rack of comparatively simple design and construction for use in the preparation of plates for multi-color printing that will effect a substantial saving in time and labor while assuring a more accurate registering of the images and characters in the several colors on the finished plates than possible with conventional methods heretofore employed.

A further object is to provide a device of the kind indicated adapted to suitably mark or cut each of a plurality of matrices so that the images carried by the plates cast from said matrices will be in absolute register.

A still further object is the provision of means for carefully determining register points on a set of matrices and then marking, cutting or punching certain portions of the edges of said matrices to serve as guides to trim the edges so cut.

It is also an object of the invention to provide a register rack of generally improved construction, whereby the device will be simple, durable and inexpensive in construction, as well as convenient, practical, serviceable and efficient in its use.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangements of parts, and in the details of construction hereinafter described and claimed, it being understood that various changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed without departing from the spirit of the invention.

The preferred embodiment of the invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a top plan view of an embodiment of our invention operatively applied to a matrix;

Figure 2 is a side elevational view of the invention in position to receive or remove a matrix;

Figure 3 is a fragmentary sectional view of the device taken on line 3—3 of Figure 1, looking in the direction of the arrow;

Figure 4 is a fragmentary sectional view taken on line 4—4 of Figure 1;

Figure 5 is a view similar to Figure 4 taken on line 5—5 of Figure 1;

Figure 6 is a fragmentary sectional view taken on line 6—6 of Figure 1; and

Figure 7 is a fragmentary elevational view, partly in section, as viewed in the direction of the arrow 7 of Figure 6.

In the drawings wherein similar characters of reference indicate corresponding parts, in the several views of the preferred form of the invention, 11 designates a base plate of any suitable material upon which a matrix may be placed. Rockingly secured to an edge of the base plate 11 by a hinge 12 is a frame 13 which, as shown in Figure 1, may be of a rectangular configuration. The frame 13 is formed of side or end members 14, 15; and back and front members 16, 17 respectively, which may be of channel or angle iron construction or other suitable material secured at their ends to form the said frame 13.

Upon the back member 16 and arranged longitudinally thereon, a bar or shaft 18 is rotatably mounted in a plurality of supporting bracket or bearing guides 19 fastened on the back member 16. Upon the shaft 18, a plurality of gears or wheels 20 provided with gear segments are fastened so that when an operating lever 21 fastened to the shaft 18 is manipulated, the said gears 20 will be turned, thereby reciprocating racks 22 formed on vertically positioned shearing or marking punches or members 10 slidably mounted in hollow posts or guides 23 secured in any suitable manner as by screws 24 to the margin of the frame member 16, and thus actuating the said shearing punches for the functions hereinafter described. A portion of the lower end of the hollow posts 23 is carried to a point flush with the bottom surface of the frame member 16, thus serving as a guide to the tapering and cutting lower end 25 of each of the shearing punches 10, as it engages and cuts or punches the margin of the matrix hereinafter described, which as best shown in Figure 3, is positioned adjacent to or slightly under the edge of the frame member 16 and over socket members 26 secured in countersunk portions 27 of the base plate 11 in any suitable manner, as by the screws 28. The pockets provided by the socket members 26 receive the shearing ends 25 of the punches 10 as they descend downwardly while cutting or punching the margin of the matrix.

Another of the gears 20 on the shaft 18, mentioned above, is coaxially engaged with a rack segment on a reciprocating shearing or marking punch 10' mounted at one end of the side member 14, the tapering or shearing lower end of which (not shown), being similarly received in

a socket (not shown) secured to the base plate in the manner described above.

By further reference to Figure 1 and as shown in detail in Figures 4 and 6, it will be seen that we have provided a pair of wires 29, 30, arranged in transverse relation, which play an important part in correctly determining the central position of a matrix 31, which may be assumed to be the key or black plate matrix, superimposed upon the base plate 11 for a purpose hereinafter described. As clearly shown in detail in Figure 4, the wire 29 is secured at either end to a block 32, which is slidably confined in the channel provided by each of the side or end frame members 14, 15, these latter being preferably of angle or channel iron construction. The blocks 32 have threaded apertures therethrough which receive the reduced threaded stems 33 of bolts 34, which are slidable in slots 35 formed in the sides of the frame members 14, 15. The enlarged portion of the stem of each of the bolts 34 is engaged against the exterior surface of the said frame members 14 and 15, adjacent the said slot 35. To secure the blocks 32 in fixed position when the wire 29 has been centered or placed at the desired position, as indicated on the scales 36 provided on each of the frame members 14, 15, a set screw 37, the stem of which is threaded in a hole arranged in each of the members 14, 15, is engaged against the top of each block 32 in order to fix the latter and consequently the wire 29 in the position desired.

The wire 30, which is also adjustable, is secured at either end to a small plate 38 having a slot 39 and arranged over another plate or strip of metal 40, slidably secured to the front frame member 17 by screws 41, riding in slots 42, formed in the plate 40 and threadedly engaged in holes (not shown) in the frame members 16 and 17. The plate 38, as indicated above, is adjustable relatively to the lower plate 40 by means of a screw 41' seated on a washer 43, the said upper plate 38 resting on the lower plate 40, the screw 41' riding in the slot 39 and being threadedly engaged with the lower plate 40. By the above means, the wire 30 can be tightened or loosened as desired, which is accomplished by first loosening the screw 41' and then moving one or both of the upper plates 38 transversely relatively to the lower plates 40, after which the screw is tightened. In addition, the wire 30 can be centered on and moved relatively to the scales 44 secured on frame members 16, 17, by manipulation of the screws 41, thus permitting the plates 40, which carry the wire bearing upper plates 38, to be moved or slid longitudinally along the front frame member 17.

In order to correctly mark or cut each of a plurality of similar matrices employed in multi-color printing preparatory to trimming, we have provided a plurality of adjustable position-indicating members 45 which are adjustably secured to the side or end frame members 14 and 15. The position-indicating members 45 each consist of a pair of links or arms 46, 47, each provided with a slot 48, 49 respectively, and adjustably joined one to the other, by a screw 50, the stem of which protrudes through the slots 48, 49 in the adjustable links 46, 47. As indicated in Figures 1 and 5, the stem of the screw 50 is engaged by an adjusting nut 51, having a widened knurled head, the reduced portion of the nut 51 being clampingly engaged against the upper link 47, the head of the screw 50 being similarly engaged against the lower link 46. Each of the position-indicating

members 45 or rather the lower link 46 thereof, is swingingly mounted on either of the side frame members 14 and 15 by the same means described above for securing both links 46, 47 together; i. e., a screw 50' and adjusting nut 51', it being observed that the position-indicating members 45 are arranged in pairs on each of the side or end members 14, 15. Secured to the ends of each of the upper links 47 of the members 45, is a needle or point 52 which may be placed at a predetermined point on the matrix 31, as clearly shown in Figure 1.

Upon the front frame member 17, means are provided for lifting or swinging the frame 13 and for securing same in fixed position upon the base plate 11, which consists in a handle 53 secured to the said member 17 and serving as a convenient means for raising or lowering the same. For locking the frame 13 to the base plate 11, any suitable means may be employed, which in the present instance, consists of a spring-pressed plunger 54 positioned in a pocket 55 provided in the base plate 11, the plunger 54 having a handle or knob 56 for convenient manipulation thereof. As best shown in Figure 6, the exterior end of the spring-operated plunger 54, where it joins the knob 56, is received in a small pocket 57, provided by an outward flaring 58 of the lower depending end of the angle iron member forming the front frame member 17, and a flange 59 formed on a longitudinally positioned short strip 60 secured to the bottom of the base plate 11. The exterior end of the plunger 54, mentioned above, it will be seen, is clampingly engaged in the pocket 57, mentioned above, thereby maintaining the frame 13 in locked position to the base plate 11, as shown in Figure 6. When it is desired to raise or angle the frame 13, the manipulating handle or knob 56 of the plunger 54 will be pressed inwardly, the reduced stem 61 of the knob 56 passing through an opening provided between the adjacent flared end 58 of the frame member 17 and the flange 59 of strip 60. The pressing inwardly of the plunger 54 will remove the outer end of the large diameter portion of the plunger 54 from the pocket 57 which confines same, it being observed that the flared portion 58 of the frame has a reduced outlet which will permit only the stem 61 of the plunger 54 to pass therethrough. The entire frame 13 may now be swung upwardly about the hinge 12, as best shown in Figure 2.

In operation, the key or black plate matrices are first center-lined and then put in the rack so that the center lines on the matrix will coincide with the center wires 29, 30 of the frame 13. The registration needles or points 52 are next set to the desired points on the characters of the matrix 31 by manipulation of the adjustable links 45, 47, after which the operating lever 21 controlling the operation of the shearing punches or cutting blades 10 and 10' is manipulated to cut or mark the matrix 31 as a guide where it is to be trimmed. This key or black plate matrix, as now prepared, may be considered as a model for the other or color matrices.

Each of the color plate mats are next placed in turn in the rack and the color characters thereon set to the pre-determined registration points, as found on the key plate, and the lever 21 again manipulated to cut or otherwise mark the matrix to indicate where it is to be trimmed. The shearing punches or cutting blades 10 make cuts or marks in the margins or edges of the matrix 31 on two sides, as indicated by the position of the parts in Figure 1, the two cuts on 75

the long side of the matrix being used as a guide to trim that edge while the cut made by the third knife or blade 10' mounted on the frame member 14, is used as a guide for trimming one of the short edges. The matrix is then put in a squaring machine and the cuts made in the two sides of the matrix pre-determine the correct registering of the images on the finished plates which are obtained from the matrices.

In preparing the plates from the matrices, it is of course, necessary that they be cast and finished in such manner that they can be placed on the printing cylinders against fixed stops with a view to the printing of the several colors in correct register. For this purpose, it is necessary that the matrix for each color be trimmed about the four edges with definite relation to certain chosen register points. One of these latter might be the intersection of two definite lines in the picture or any prominent spot conveniently located. As mentioned above, the key or black plate matrix is preferably taken first, and then centerlined, after which certain points are selected as register points, before marking or cutting the margins or edges of the matrix preparatory to trimming in a squaring machine. The color plate matrices are next taken up in turn, and the margins or edges marked or cut after the register points are located, which is done conveniently and quickly by manipulating the position-indicating members 45 until the needles or points 52 are over the points previously selected on the key or black plate matrix.

Up to the present time, in multi-color printing, particularly of the type required in modern newspaper color supplements in which a number of impressions are made from similar plates, it has been customary to employ dividers with a view to determining the correct register points on each of the similar matrices employed so that the images in colors on the plates prepared from the matrices will correspondingly register. As speed is an essential requirement of newspaper work, the loss of time incurred by the use of dividers, etc., in determining the register points on matrices preparatory to the preparation of the plates therefrom has been a source of delay which it was felt a more improved means and method could obviate. In addition to this, an accurate determination of the correct register points by the use of dividers as mentioned above has been found impractical under the conditions met with in present-day multi-color printing, particularly for newspapers and magazines.

The present method and construction permits not only a far more convenient and expeditious method of preparing matrices than the comparatively clumsy and inefficient methods now conventional which, among others, make use of dividers, etc., but it also insures greater accuracy of registration so that the images on the finished plates prepared therefrom will be in correct register. The device is of a rugged, durable construction and its manipulation requires no manual dexterity or technical knowledge on the part of the operator over that possessed by the layman. Practically all of the discarding, distortion, trimming, etc., of plates after they have been put on the press is avoided by the absolute uniformity of the results obtained by the present invention.

We have also found the above rack is equally useful when employed for the purpose of single color registration as for the multi-color registration described; and that it lends itself also for use in obtaining "hair-line" register in "back up"

pages printed on the opposite side of the sheet and in securing absolute uniformity of margins throughout book signatures, newspaper products or other printed matter. A number of other useful features of our rack such as its use in the transposition of subjects in matrices, the location of inserts, and in fact any operations of the general character indicated wherever registration is necessary or desirable, might be mentioned as further indicating the scope of the invention.

We are aware that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and we therefore desire the present embodiment to be considered in all respects as illustrative and not restrictive, reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

What we claim is:

1. A register rack for use in connection with multi-color printing, comprising a base, a frame hingedly mounted on the base, said base serving as a mount for a matrix, means for centering said matrix on the base relatively to the frame, a plurality of members adjustably mounted in the frame for determining the position of registration points on the matrix, and other means secured to the frame for uniformly marking said matrix simultaneously on a plurality of adjacent edges with respect to said points for trimming preparatory to casting printing plates therefrom.

2. A device of the kind described comprising a frame, center-positioning means for a key matrix secured to said frame, a plurality of members mounted on the frame for determining register points on the key matrix, other means operably mounted on the frame for uniformly marking said key matrix simultaneously on a plurality of adjacent edges after being centered and after the register points thereon are determined whereby after said matrix is marked, a plurality of other matrices may be similarly marked, and printing plates prepared from all of said matrices may be in correct register for multi-color printing.

3. A device of the kind described comprising a base, a frame hingedly secured to said base, adjustable centre-positioning members secured to the frame for correctly aligning therewith center lines on a key matrix, a plurality of other members movably secured to the frame, said members being adjustable for determining register points on said key matrix when mounted on said base, a plurality of punches operably mounted on the frame for marking said matrix and other matrices uniformly with respect to said register points, and means to lock the frame to the base for normal operation thereof.

4. A register rack of the kind described comprising a base, a frame hingedly secured on said base, means for locking the frame to the base when desired, a pair of centre-positioning wires slidably secured to the frame and adjustable relatively to each other, a plurality of arms pivotably secured to the frame, each of said arms having register points thereon movable in at least two directions, and a shaft rockingly mounted on the frame, guides fastened to the frame, and punches reciprocatingly mounted in said guides said shaft having gears engaged with said reciprocating punches.

5. A device of the character described, comprising in combination, a frame, slidably adjustable positioning members secured to the frame for determining the position for a key matrix

- in the frame, a plurality of elements adjustably secured to the frame for determining register points on said key matrix, an operating lever connected to the frame and means including a plurality of punches mounted on the frame and actuated by said operating lever for marking the margins of said key matrix and then the margins of each of a plurality of matrices located by said register points in correspondence with the position of the key matrix.
6. In a matrix register rack for use in connection with multi-color printing, a base, a frame hingedly mounted on the base having members adjustable to correspond with register points on the matrix, means secured to the frame for cutting edges of said matrix, said means including punching instrumentalities and guides therefor, and manually operable means including a gear and a coacting rack for actuating the said punching instrumentalities.

7. A device of the character described, comprising in combination, a frame, positioning members secured to the frame for determining the position for a key matrix in the frame, a plurality of elements secured to said frame for determining register points on the key matrix, an operating lever connected to the frame, and a plurality of punches mounted on the frame and actuated by said operating lever for marking the margin of said key matrix and then the margins of each of a plurality of matrices located by said register points in correspondence with the position of the key matrix.

8. A combination as specified in claim 6 wherein a pair of positioning elements are provided, said elements being arranged in transverse relation relatively to one another and adjustably mounted on the frame.

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