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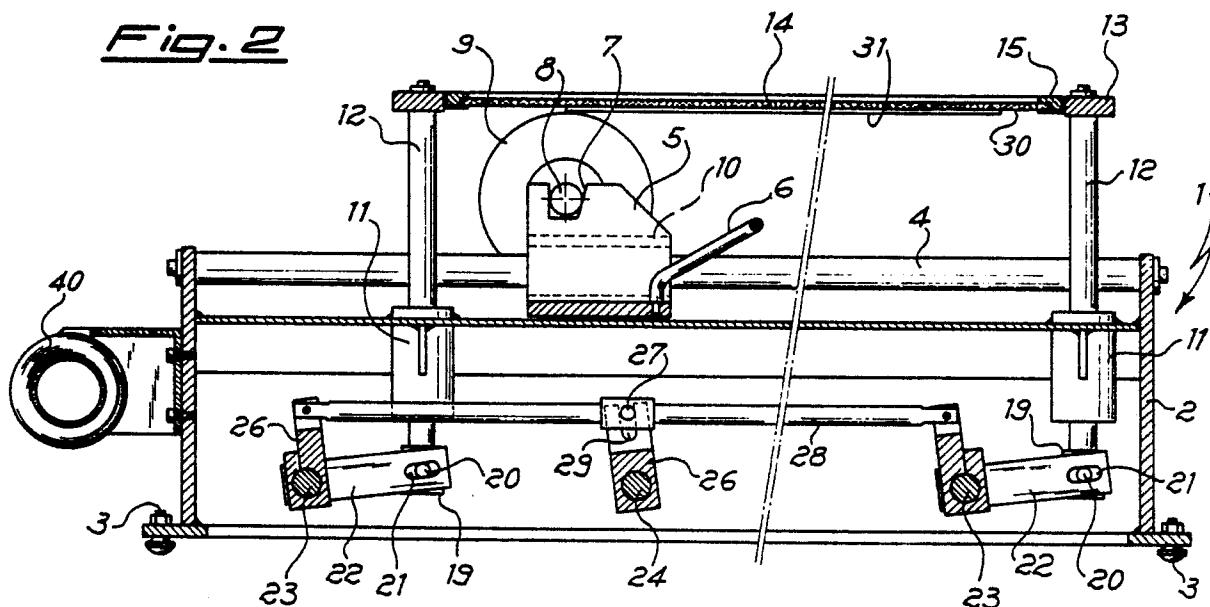
71 Applicant: **Bartesaghi, Angelo**
 6, Via Roccolo
 I-22053 Lecco (Como)(IT)

72 Inventor: **Bartesaghi, Angelo**
 6, Via Roccolo
 I-22053 Lecco (Como)(IT)

74 Representative: **Marietti, Giuseppe**
CENTRO DI CONSULENZA IN PROPRIETA'
INDUSTRIALE Viale Caldara, 43
 I-20122 Milano(IT)

54 An apparatus and method for setting clichés on printing rollers.

57 An apparatus and method for setting clichés on printing rollers, wherein a transparent and screened plate (14) can be turned over to allow the positioning of a cliché (31) on it, the transfer of said cliché to a printing roller (9) and the control during each step, specially once the transfer is over, of the cliché correct setting.



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"AN APPARATUS AND METHOD FOR SETTING CLICHES ON PRINTING ROLLERS"

The present invention generally relates to the printing field, for instance the multi-color printing and more particularly to an apparatus and method for setting clichés on printing rollers.

It is known that, in order to obtain multi-color prints, it is necessary to reproduce on the same sheet and in the same position the print of several clichés, each inked with an ink of a given different color. In order to always obtain the same positioning of the image to be printed, it is necessary that the different clichés are well set with a perfect superimposition.

The cliché setting operation is presently performed by different procedures, among which here is mentioned the one consisting in having a bearing plate, preferably provided with a screen, where the image to be printed is placed, preferably on tracing paper; the cliché, already with the image to be reproduced corresponding to the one outlined on the tracing paper, is then placed on it, said cliché being preferably a folding sheet made of plastics material. When the image on the tracing paper and the one on the cliché are "set" to one another, a printing roller provided with a biadhesive film is passed on the plastics cliché, in a way that the cliché winds on said roller and remains in position thanks to the adhesive.

Once the cliché is fixed on the printing roller, the superimposition of the two images is checked again, namely the image on the screen and the one on the cliché, by rolling the roller on the screened bearing plate and checking on the same, by means of a mirror, whether the superimposition of the two images is still correct. Said procedure is performed for each printing roller to be used in the multi-color printing of the same image.

This known setting system has proved to be very onerous and little reliable, in that the control of the superimposition of the two images by means of a mirror involves errors of parallax and always requires a precise positioning of the mirror, because the control is performed through the latter and therefore depends on said positioning.

An object of this invention is to eliminate the source of said setting errors and the difficult of checking through the mirror, by providing a simple and economic apparatus, easy to use for setting clichés on printing rollers.

Another object of the present invention is to provide an apparatus of the above mentioned type, wherein the setting operation can be repeatedly performed with simple mechanical means, without requiring the use of a checking mirror.

Still another object of the invention is to provide a process for setting clichés on printing rollers, which can be carried-out with the apparatus according to the invention.

More detailedly, the apparatus for setting clichés on printing rollers according to the present invention is of the type having a transparent and possibly screened plate to bear the image to be reproduced and the related cliché, as well as a printing roller designed to wind on itself the set cliché, and is characterized in that the transparent bearing plate is hinged on a support which can be moved vertically in both directions, while the printing roller is mounted in a way as to revolve on a saddle, horizontally movable in two opposite directions under the transparent bearing plate, said apparatus comprising means to perform said vertical movement in both directions of said bearing plate, as well as means to guide said saddle in its horizontal movements.

According to a feature of the present invention, the support of the transparent bearing plate consists of a frame provided with columns sliding in relate guide bushings, the columns being connected at their free end to said means for performing the vertical movement of the support in both directions.

According to another feature of the present invention, said means to guide the saddle in its horizontal crosswise movement are in the form of longitudinal sliding guides integral with the apparatus frame.

According to still another feature of the present invention, said means to perform the reciprocating vertical movement of said support comprise a control lever and a leverage for each support column, lever and leverages being mechanically connected to one another in a way as to transmit the movement of said control lever to the transparent plate support.

Finally, the invention also relates to a method for setting clichés on printing rollers with an apparatus as above stated and wherein is applied a check image onto said bearing plate, characterized in that it comprises the following steps:

- rotate by 180° the bearing plate around its hinge axis so as to expose its lower surface;
- place, in correspondence with the check image, a cliché with the image to be printed, shaped as a plastic sheet or the like, in a way as to superimpose the two images, and fix it provisionally in position;
- rotate backwards by 180° the transparent bearing plate with the image and cliché fixed on it, so that the latter is under the plate;

-lower the bearing plate with the cliché fixed on it as far as to reach a tangency with the printing roller;

-slide the printing roller under the cliché in a way that the latter winds around the roller, be fixed to it by an adhesive and detaches itself from the transparent plate; and

-slide the roller onward and backward under the bearing plate with the image fixed to it in order to check by direct viewing and/or through magnifying means, from the apparatus top, whether the superimposition between the image and the cliché is maintained.

These and other features of the invention will become more evident from the following detailed description of a preferred embodiment of the apparatus according to the invention, given as a non limiting example and shown in the accompanying drawings, wherein:

-figure 1 is a side view of an apparatus for setting clichés on printing rollers according to the invention;

-figure 2 is a cross-section taken along the longitudinal axis of the apparatus of figure 1;

-figure 3 is a cross section taken along line III-III of figure 1; and

-figure 4 is a cross section of the hinge connecting the transparent bearing plate to its support.

As it can be seen from the drawings, the apparatus, indicated as a whole by reference 1, for the alignment of clichés on printing rollers, comprises a base 2 supported by adjustable feet 3 and having on top two longitudinal columns 4' which serve as sliding guides for a saddle 5 provided with a handle bar 6 and having two side seats 7 to freely receive pivots 8 of a printing roller 9 designed to carry a cliché. For this purpose the saddle 5 presents on its two sides bushes 10 designed to slide on said guide columns 4.

On the top wall of base 2 four sliding bushes 11 are fixed, preferably on the four corners of base 2, in order to receive four sliding small columns 12. The columns 12 are fixed to the four corners of a support frame 13, the open space of which houses a bearing plate 14, made of a transparent material and provided with a printing screen, in a traditional way.

The bearing plate 14 serves in this case as a lid and is fixed to the support frame 13 by means of a rim 15 which, as shown in figure 4, surrounds the bearing plate 14 and is fixed to hinges 16 which connect the same to a side of support frame 13, in a way as to allow the plate 14 to rotate around an axis 17 (see reference 14' in figure 3);

therefore the bearing plate 14 can take a closed position, as shown in the figures, and an open position (when rotated by 180°), in which its lower surface 30 is upturned.

On the plate side opposite to the one carrying the hinges, said rim 15 has a handle 18 for opening and closing the lid formed by said plate 14, as well as a stop area on frame 13 to define the said plate closed position.

Bushes 11 extend inside the base 2 and the ends of columns 12 which, below bushes 11, have a section with larger diameter 19 with two pivots 20 aligned and protruding perpendicularly to the axis of the related column 12. Said pivots 20 are able to engage in a slot 21 provided in a forked end of a one-armed lever 22, the other end of which is fixed to a shaft 23 rotatably mounted crosswise to the base 2. The shafts are two in number and therefore each of them bears two levers 22, each lever being positioned in correspondence with one of the columns 12 to transmit its motion to the same in both vertical directions, in order to lift or lower the transparent plate 14.

A third shaft 24 is placed between said two shafts 23 and can be freely rotated on the base 2, said shaft 24 carrying at one of its ends a control lever 25, positioned out of the base 2.

Another forked lever 26 is fixed in the middle of shaft 24 and is engaged by means of slots 29 in pivots 27 provided on a longitudinal rod 28 connecting the levers 26 so to allow transmission of the rotary motion from the control lever 25 to shafts 23 through the shaft 24. The rotation in one direction of the control lever 25 lowers the transparent plate 14 and the rotation in the opposite direction raises the plate 14.

The apparatus works in a very simple way.

First of all, with the support frame 13 up, the transparent screened plate 14 is rotated 180° around its hinge by means of handle 25, in such a way that the lower surface 30 of said plate 14 is turned upwards. After the plate 14 turnover, the image on tracing to be reproduced is fixed to the screen surface 30, for instance by an adhesive tape, and then in correspondence with the image thus fixed, always keeping the plate 14 upturned, a cliché 31, for example in the form of a plastic sheet with the image already formed on it, is applied in a way that the two images are set or aligned, namely that they result perfectly superimposed. Said superimposition of the two images can be easily observed directly or by means of a magnifying glass.

Once the two images are exactly superimposed, the cliché 31 is fixed on plate 14, for instance by an adhesive tape, and the plate 14 is newly rotated into its closed position, inside the support

frame 13; in this way the cliché 31 is now under the plate 14 and the superimposition of the two images can be checked again without using mirrors.

When this operation is over, a biadhesive tape (taken from roll 40) is applied onto the surface of roller 9 and the support frame 13, together with plate 14, is lowered using the control lever 25 as far as the cliché 31 touches to the printing roller surface. Then, by horizontally moving said saddle 5 on the two slide columns 4, by means of handle bar 6, cliché 31 is wound on the roller surface, where it remains thanks to the adhesive, after its detachment from plate 14.

The alignment is checked again by sliding several times the saddle 5 onwards and backwards and stopping it in correspondence with the image fixed on the screen. In case said check is positive, the roller 9 with cliché fixed on it is removed from the saddle 5 and a new roller without cliché is mounted to repeat the cycle of operations as above described for a different color.

What above clearly shows that the apparatus herein illustrated and described allows to perform the settlement of clichés on printing rollers in a simple way and always under the operator's direct control, thus eliminating the drawbacks of the systems used up to now.

Claims

1. An apparatus for setting clichés on printing rollers, of the type having a transparent and possibly screened bearing plate (14) to receive the image to be reproduced and a related cliché (31), as well as a printing roller (9) designed to wind up on its mantle the set cliché, characterized in that said transparent bearing plate (14) is hinged (17) on a support (12,13) which can be moved vertically in both directions, while the printing roller (9) is mounted in a rotatable way on a saddle (5) horizontally movable in two opposite directions below the transparent bearing plate (14), said apparatus comprising means (19-29) to perform said bearing support plate vertical motion in both directions, as well as means (4, 10) to guide said saddle (5) in its horizontal translations.

2. An apparatus according to claim 1, characterized in that the support (12, 13) of said transparent plate (14) comprises a frame (13) and support columns (12) sliding in guide bushes (11), said columns (12) being connected at their free end to means (19-29) for controlling the vertical motion in both directions of said support (12, 13).

3. An apparatus according to claim 1, characterized in that said means to guide the saddle (5) in its horizontal motions comprise longitudinal slide guides (4) integral to the apparatus main frame.

4. An apparatus according to claim 1, characterized in that said means to perform the reciprocating vertical movements of said plate (14) comprise a control lever (25) and a leverage (20-23) for each support column (12), the lever (25) and leverages (20-23) being mechanically connected to each other in a way as to transmit the control lever motions to the transparent plate support.

5. An apparatus according to claim 2, characterized in that the bottom ends of said columns (12) have a section (19) with a larger diameter as a stop for the upward movement of the transparent plate support (12, 13), and bear two aligned pivots (20) protruding at a straight angle with respect to the column axis for the control of its movement.

6. An apparatus according to claims 4 and 5, characterized in that said control lever (25) is fixed to a transverse shaft (24) having forked arms (26) provided with slots (29) designed to receive pivots (27) connected to a transmission rod (28) which actuates a couple of forked arms (26) centrally aligned on two other opposite shafts (23) each having at its two ends arms (22) adapted to be engaged with the pivots (20) on said sections (19) of larger diameter of the support columns (12).

7. A method for setting clichés on printing rollers, with an apparatus according to one of the preceding claims and wherein a check image is applied on said bearing plate characterized in that it includes the following steps:

-rotate the transparent bearing plate (14) by 180° around its hinge axis (17) so as to expose its lower surface;

-place in correspondence with the check image a cliché (31) with the image to be printed, shaped as a plastic sheet or the like, in a way as to superimpose the two images, and fix it provisionally in position;

-rotate backwards by 180° the transparent bearing plate (14) with the image and cliché (31) fixed on it, so that the latter is under the plate (14);

-lower the bearing plate (14) with the cliché (31) fixed on it as far as to reach the tangency with the printing roller (9);

-slide the printing roller (9) under the cliché (31) in a way that the latter winds around the roller and become fixed to it by an adhesive, detaching the cliché from the transparent plate (14); and

-slide the roller (9) onward and backward under the bearing plate (14) with the image fixed on it in order to check by direct viewing and/or by mag-

nifying means, from the apparatus top, whether the superimposition between the image and cliché is maintained.

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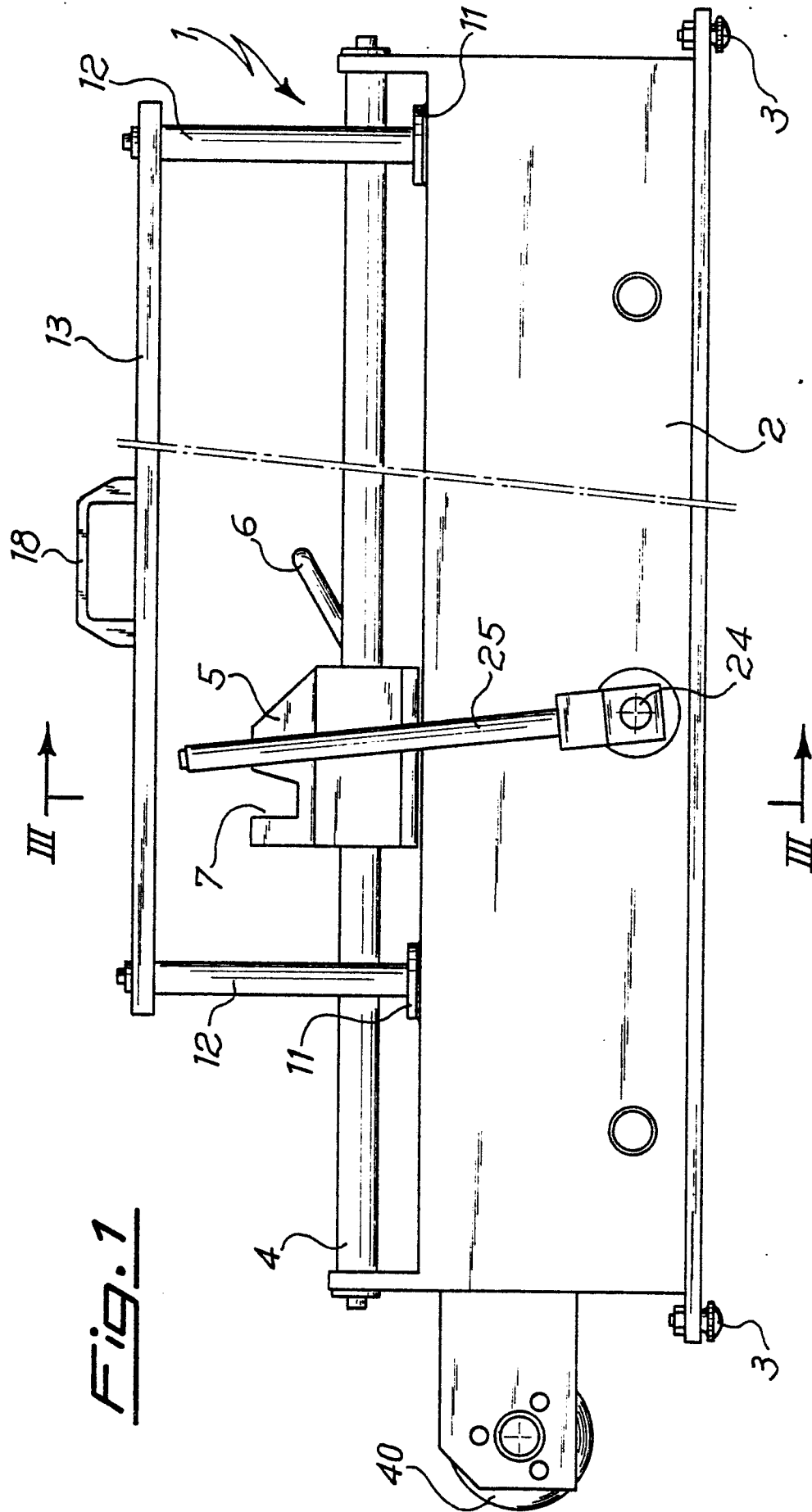
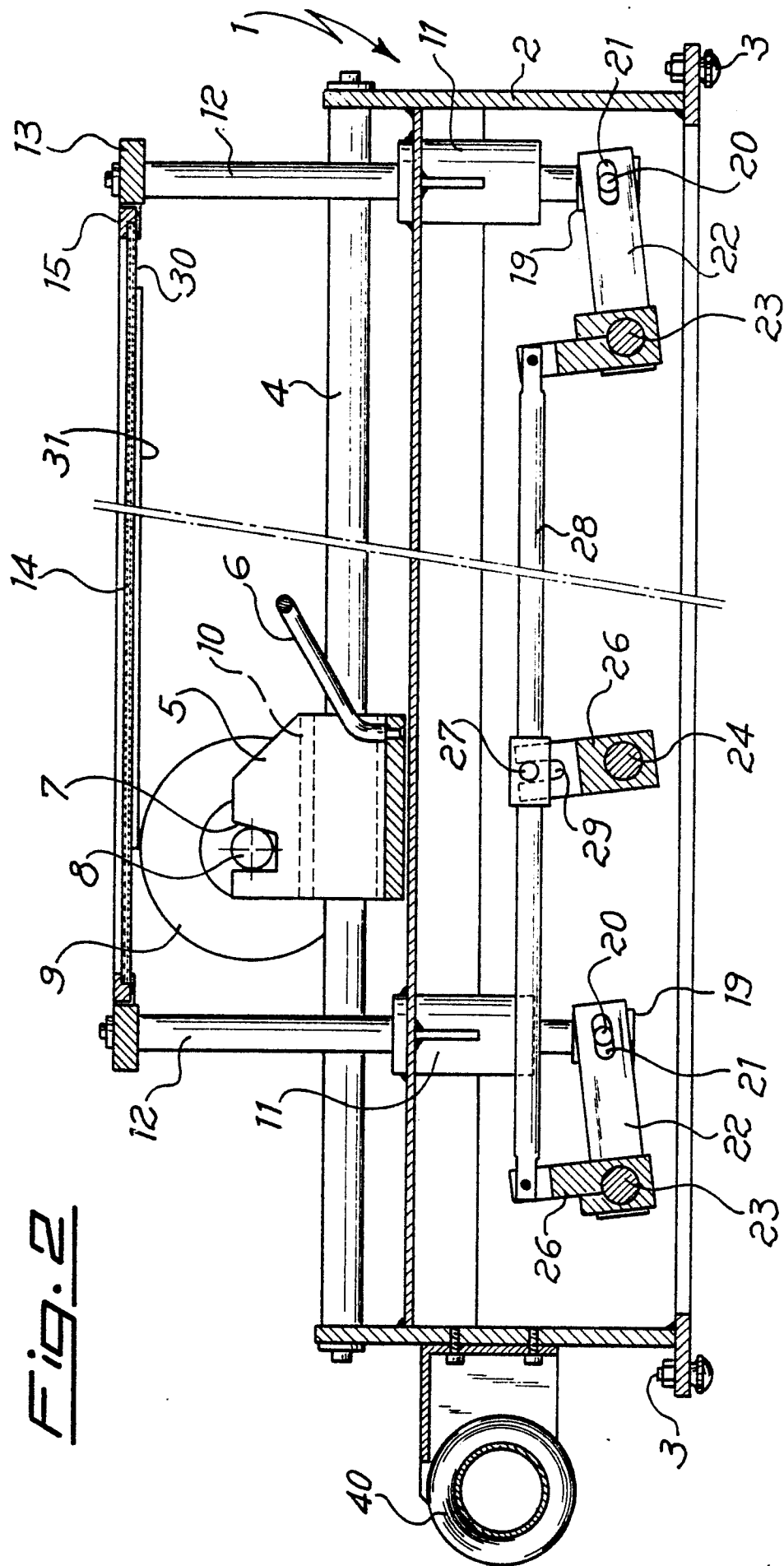


Fig. 1

Fig. 2



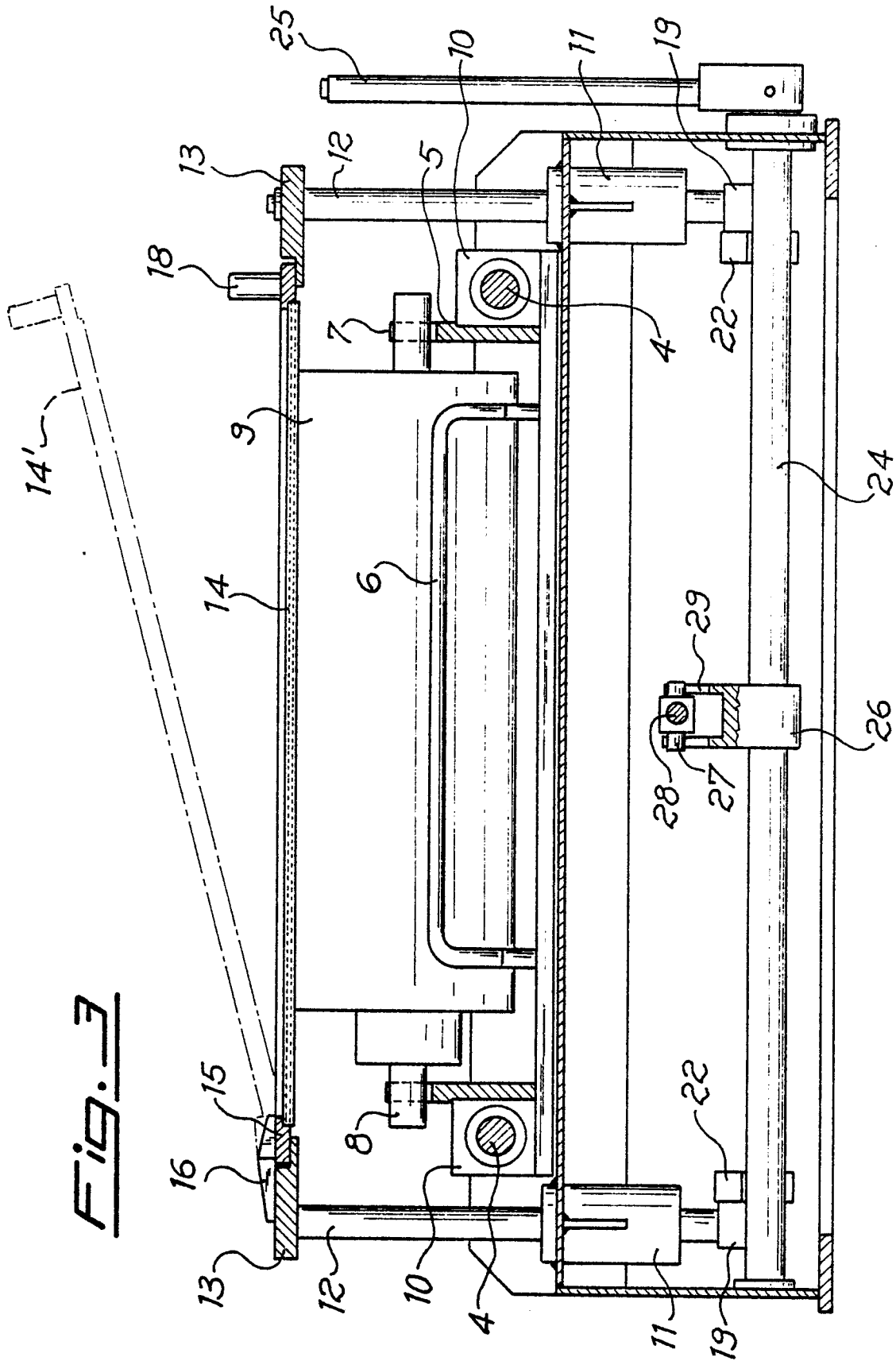


Fig. 4