

- [54] REGISTER BAR FOR PRINTING PRESS
SHEET CONVEYORS
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[58] Field of Search 271/48, 49, 50, 52,
271/58, 59, 60, 51, 53; 287/49, 51

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[57] ABSTRACT

A ball support for printing press conveyors. The support has quick attaching facilities with adjustment features allowing precise location of balls relative to register stops while allowing adjustment of the height of the ball support above the paper being fed to the register stops.

7 Claims, 8 Drawing Figures

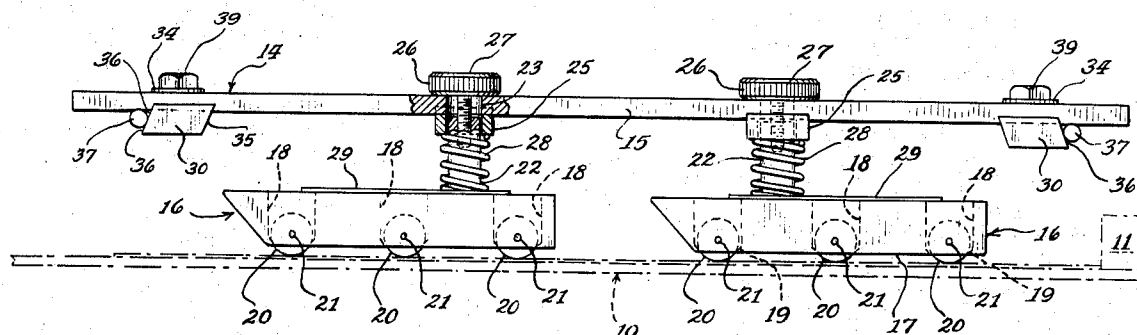


Fig. 1.

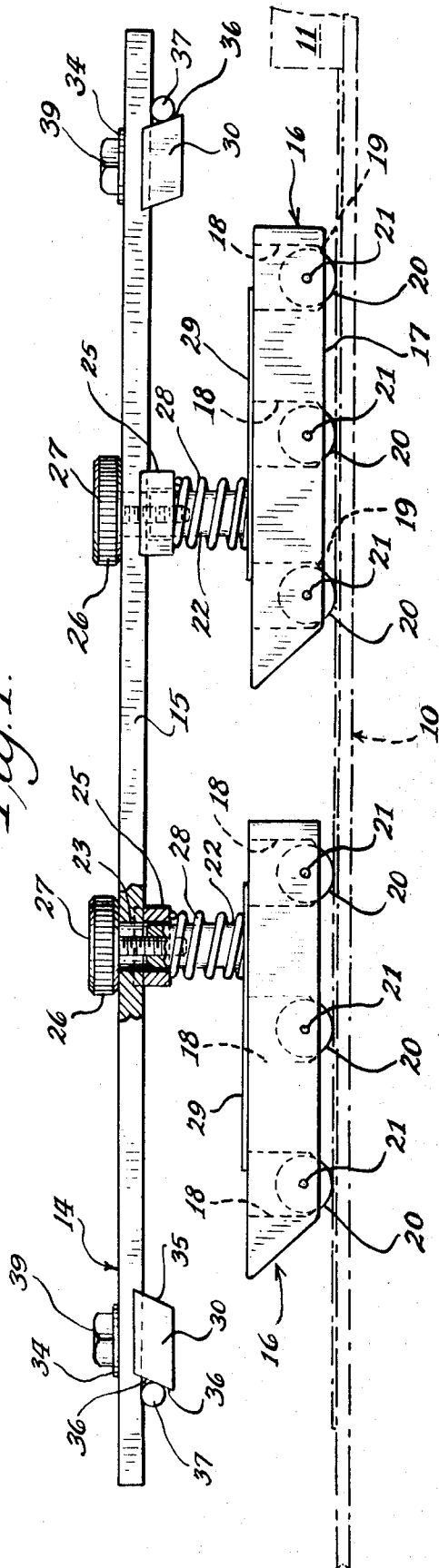
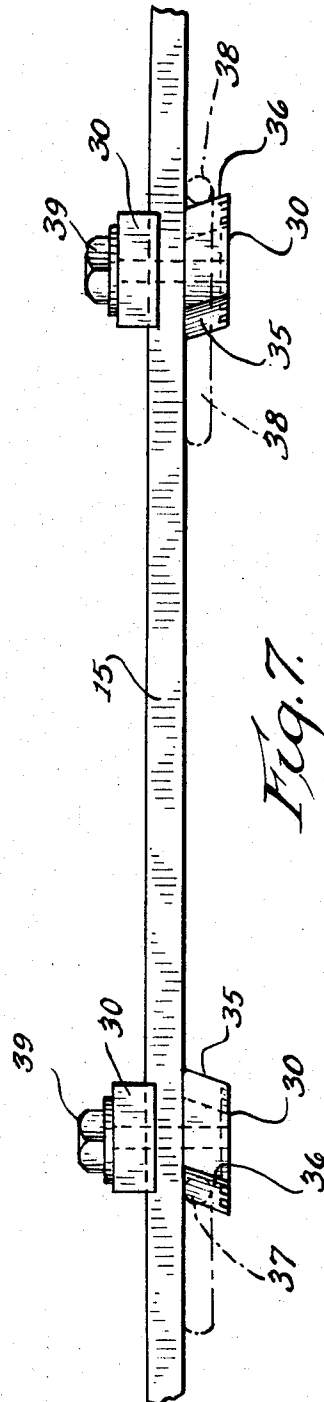
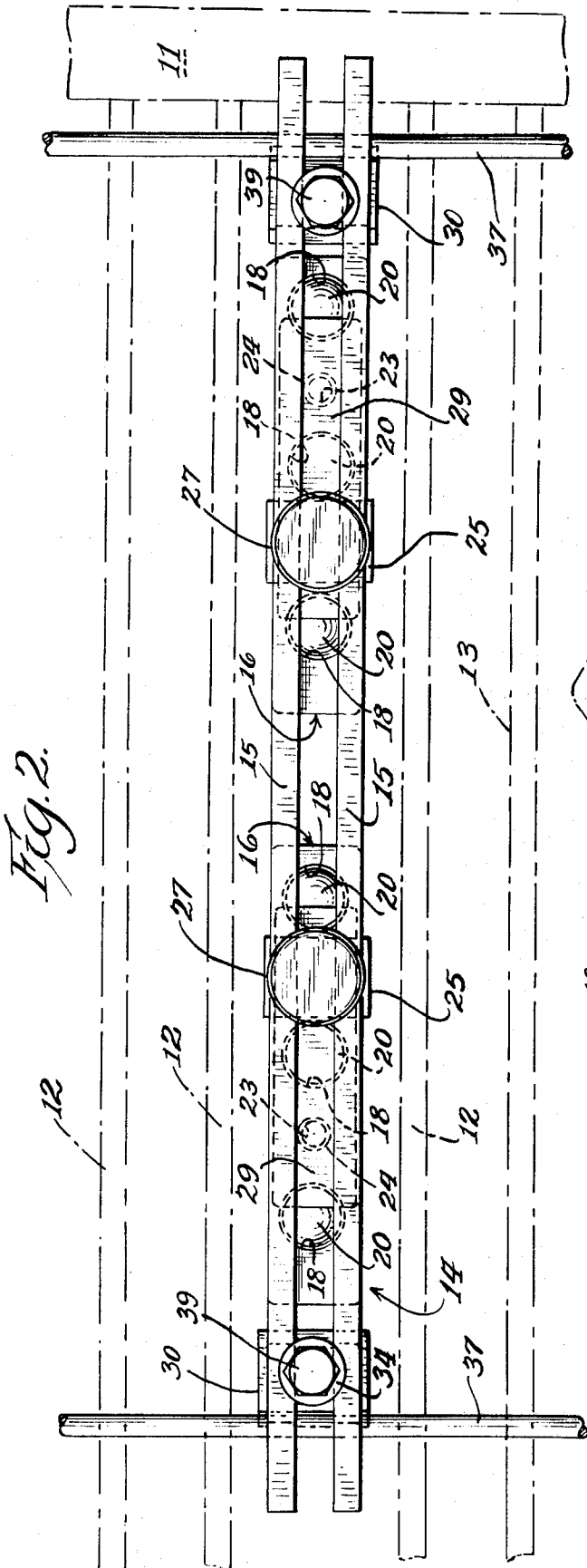
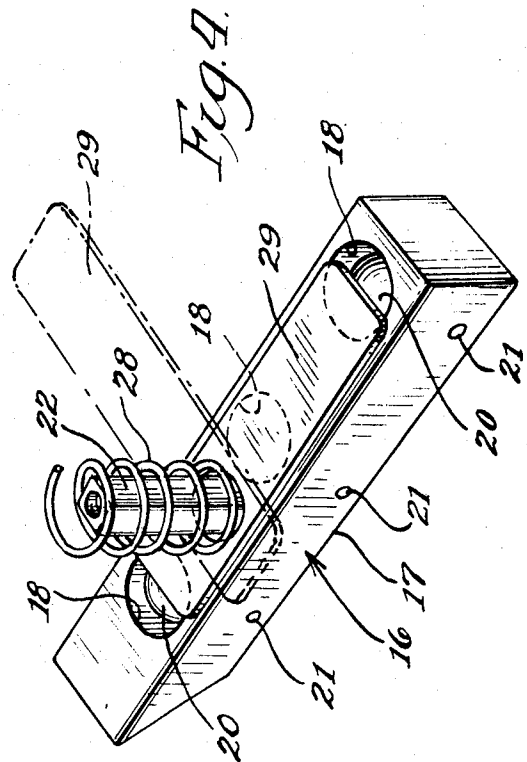


Fig. 7.



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Fig. 3.

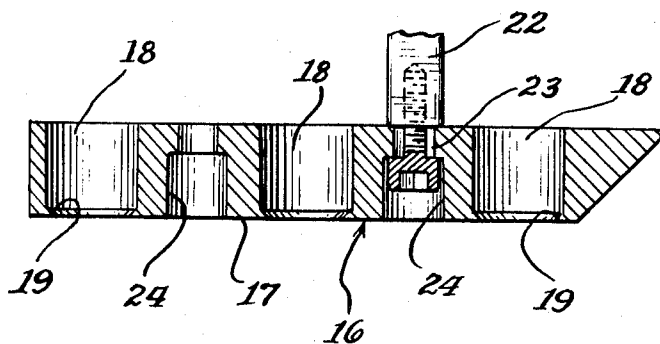


Fig. 5.

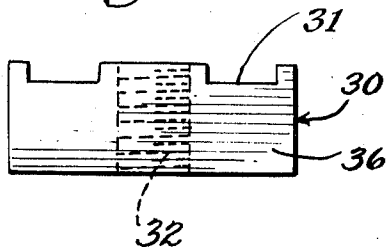


Fig. 6.

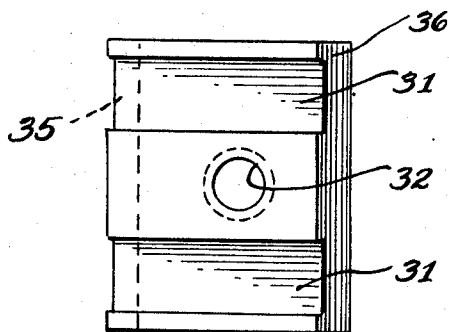
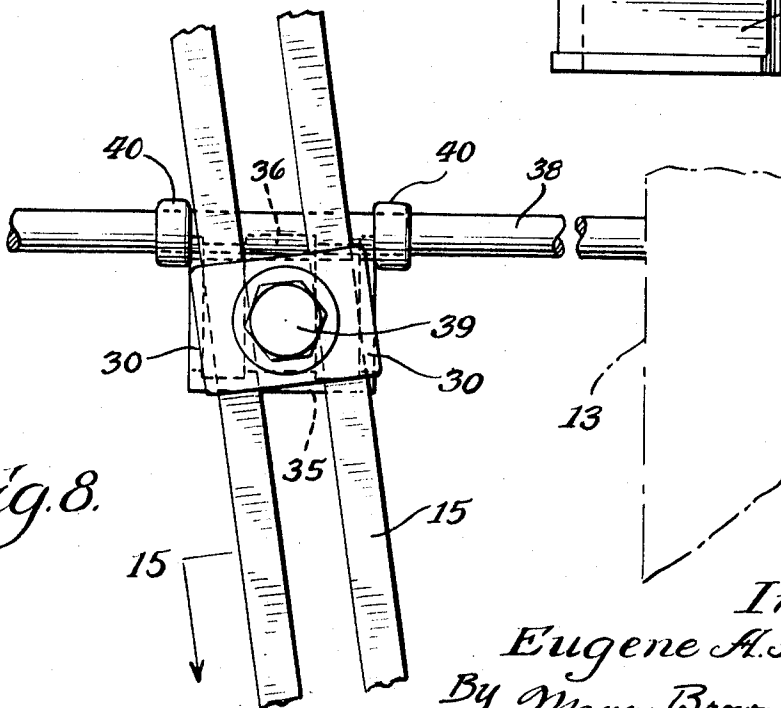


Fig. 8.

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REGISTER BAR FOR PRINTING PRESS SHEET CONVEYORS

The present invention is directed to improvements in mechanisms for holding sheets against the conveying surface of sheet feeders for printing presses.

Sheet feeders for printing presses oftentimes include some mechanism for holding paper against the sheet conveyors as the sheets are delivered against the register stops of a printing press. As paper is fed against the stops, it tends to rebound and may also tend to bulge upwardly. Mechanisms used to restrict the rebounding and bulging of paper have taken the form of rollers which ride on the upper surface of the paper, and have also taken the form of ball supports with spaced balls which rest by gravity on the paper as it is delivered against the stops. In practice, uneven conveyor surfaces may be present, in which case it is difficult to exert the exact amount of pressure desired at various points with known mechanisms. Also, previous ball supports have a fixed spacing between balls, whereas in actual practice it is desirable to vary the point of pressure engagement of the balls, depending upon such things as the size of the paper stock being fed, the thickness of the stock, and the speed of the feed.

With the foregoing in mind, the primary purposes of the present invention are to provide a register bar with balls therein in such a way that the number of pressure points developed by the balls and the location thereof is easily varied towards and away from the register stops and to enable mechanism of this type to compensate for uneven conveyor surfaces while providing simple attaching and detaching facilities for such mechanism and simple means for cleaning such mechanism.

These and other purposes will become more apparent in the course of the following specification and claims when taken with the accompanying drawings, in which:

FIG. 1 is a side view of a typical register bar mechanism incorporating the principles of the present invention;

FIG. 2 is a plan view of the mechanism illustrated in FIG. 1;

FIG. 3 is a sectional view of a ball supporting block illustrated in FIGS. 1 and 2;

FIG. 4 is a perspective view of the ball supporting block assembly illustrated in FIG. 1;

FIG. 5 is an end view of a clamping block illustrated in FIGS. 1 and 2;

FIG. 6 is a plan view of the clamping block illustrated in FIG. 5;

FIG. 7 is a side view of the mechanism adjusted for use with a diagonal type of conveyor; and

FIG. 8 is a plan view of a portion of the mechanism illustrated in FIG. 7.

Like elements are designated by like characters throughout the specification and drawings.

With specific reference now to the drawings and in the first instance to FIGS. 1 and 2, the numeral 10 designates a conventional sheet conveyor for delivering paper to the register stops of a printing press indicated in dotted outline at 11. The conveyor may take the form of plural endless belts 12 which carry the paper sheets on the upper surface thereof for delivery against the register stops 11, one at a time. In conveying mechanism of this type edge guides generally represented at

13 may be employed so as to properly align the edge of the paper delivered to the register stops.

In accordance with the present invention, an elongated support generally designated at 14 is defined by a pair of spaced and generally parallel rails 15. The rails 15 may be formed from bar stock with a square cross-section.

Plural ball supports generally designated at 16 are supported from the elongated support 14. In some cases only a single ball support may be utilized, whereas in other cases two or more may be utilized, depending upon the length of the paper stock being fed to the printing press and the points of pressure desired. Each ball support is in the form of an elongated block 16 having a flat undersurface 17. The end of the ball support farthest removed from the stop is inclined upwardly with respect to the conveyor 10 and away from the register stops. The lower flat surface of the ball support is adapted to be positioned a small distance above the surfaces of the conveyor 10.

Each ball support includes a plurality of ball receiving cavities equally spaced along the length thereof as designated at 18. The cavities 18 open through the top of the ball support. Each cavity 18 may be formed as a bore extending perpendicular to the lower surface 17 with a reduced cross-section 19 at the lower surface 17. Paper retaining balls 20 are positioned in the cavities 18 and are adapted to rest by gravity against the surface of the sheet stock fed underneath the ball support to the register stops. The side of the ball support may be provided with indentations 21 or other suitable indicia indicating the center of the bores 18 and balls 20. The ball support is supported from the support rails 15 by means of a post 22. Post 22 is held to the upper surface of the ball support by means of a screw 23 which is received within a bore 24 in the ball support. The ball support may include a plurality of such bores 24 for selective positioning of the support post 22. Post 22 has a width enabling it to move upwardly between the rails 15. The support post 22 is mounted on the support rails 15 for selective positioning along the length thereof and for selective positioning at a selected distance from the support rails by means of clamping members in the form of a clamping block 25 which underlies the rails, and by a screw 26 having a manipulating knob 27 overlying the rails. The clamping block 25 may be grooved to match the width of the rails and receive the rails therein to preclude twisting of the block 25 with respect to the rails. The threaded shank of the screw 26 is received within a threaded bore in post 22. A coil spring 28 surrounds the post and extends between the ball support and the lower surface of the block 25 to bias the ball support 16 away from the clamping block 25 and to bias the block against the rails 15.

By means of the mounting arrangement described, the ball support 16 and post 22 may be urged upwardly manually against the bias of spring 28 to move the manipulating knob 27 away from the rails 15. In the normal operation of the structure, spring 28 biases the ball support 16 downwardly so that the rails 15 are embraced snugly by the manipulating knob 27 and by the clamping block 25.

Because of the spring mounting, the clamping block 25, screw 26, and ball support 16 may be moved axially along the support rails 15 to a selected position. In any axial position, tightening of the screw beyond that amount necessary to fix the position of the ball support

on the rails raises the ball support 16 relative to the support rails 15 so that the height of the ball support relative to the rails and to the sheet conveyor may be fixed at a selected position. Raising and lower the ball support enables a small variance in the pressure of the balls against the paper. At any selected height, the assembled ball support may be slid manually to any selected position along the rails.

In order to retain the balls 20 in the ball cavities 18, a flat retainer plate 29 may be swivelly mounted on the post 22. Plate 29 has a length such as to at least partially overlie all of the ball cavities. The width of the plate is preferably such that by swivelling it to a position 90° from the longitudinal axis of the ball support, the cavities 18 are fully exposed (see dotted position of plate 29 - FIG. 4) so that the balls 20 may be removed therefrom for purposes of cleaning or for purposes of removing one or more balls to lessen the number of pressure points on paper stock fed against the register stops.

In order to fix the support rails 15 above the paper conveyor, the support rails are fixed to clamping blocks 30 at each end thereof. Each clamping block is illustrated in detail in FIGS. 5 and 6. Each clamping block includes an upper surface grooved as at 31 to match the configuration and spacing of the rails 15 and a central bore 32 which is threaded to receive screw 33 which bears against a washer 34 on the support rails. The clamping blocks 30 include end surfaces 35 and 36 which are inclined with respect to the top and bottom surfaces of the clamping block. The outermost surface 36 is arranged to extend downwardly and outwardly with respect to the rails 15. The surfaces have a dimension such that they extend below the center of support rods 37 and 38 which are held in a fixed position above the conveyor 10. The support rails 15 and ball supports carried thereby may be positioned on the support rods 37 and 38 by flexing of the support rods 37 and 38 in an amount sufficient to allow the support rails 15 to rest on the upper surfaces of the rods 37 and 38 while the inclined surfaces 36 snap under and against the support rods 37 and 38. This may place the rods 37 and 38 slightly under tension to thereby fix the ball support assembly in position.

The present invention may also be advantageously utilized with diagonal sheet conveyors as are illustrated in FIGS. 7 and 8. In this event, the conveying belts run in a direction other than at 90° to the register stops. They may be positioned to make an angle of several degrees with the side edge guide 13. This inclination is represented by the arrow 15 in FIG. 8 and is exaggerated for the purposes of understanding. When using the present invention with a sheet conveyor of this type, plural rails as previously described are used to support ball supports as previously described. The rails 15, however, are then fixed to the rods 37 and 38 by using two clamping blocks 30. One clamping block 30 is positioned on top of the rails 15 with the grooves 31 of the blocks engaging the rails. Additional blocks 30 are positioned beneath the rails with the surface thereof opposite to the grooved surface engaging the undersurface of the rails in a frictional manner. The superimposed blocks 30 are held together to embrace the rails therebetween by means of bolts 39. The lower clamping block 30 is positioned so that its clamping surface 36 will be parallel to the axis of the support rods 37 and 38 to engage the same in the manner previously de-

scribed. Collars 40 may be positioned on the support rods 37 and 38 to prevent movement of the assembly along the length of the rods 37 and 38.

Ball supports as described are easily attached to and detached from support rods utilized with paper feeding conveyors for presses. The snap-fitting engagement of the clamping blocks facilitates this with the so-called diagonal conveyors as well as the conveyors which move perpendicularly to the general plane of the register stops.

Once the support is positioned, the ball support or supports are easily moved along the length thereof to a selected position by merely sliding the clamping elements along the support rods to the desired position.

The height of the ball support relative to the paper passed thereunder is easily adjusted by rotation of the manipulating knob to bring the ball support to the selected height. The precise axial position of the ball support is important, especially when considering that different sizes of paper stock are run on the same press. Supports as formed herein may be positioned so that the center of one ball is positioned precisely over or immediately behind the trailing edge of a sheet of paper when firmly against the register stop. This helps to minimize bouncing of the paper stock from the register stops.

Since the balls provide a driving weight on the paper stock being fed, the amount of this drive is easily adjusted through selective use of one or more ball support blocks and by selecting the number of balls and positions thereof in each ball support block, together with raising and lowering of the support block.

The balls are easily removed from the cavities when their use is not desired or when it is desired to clean the balls and cavity from lint and dust which may accumulate by rotation of the retaining plate.

While the invention is intended basically for use with sheet conveyors for printing presses, the invention may be utilized in other forms of sheet or sheet-like conveying facilities such as conveyors or delivery sheets to cutters, punching mechanisms, etc.

I claim:

1. A sheet retainer for use with conveyors for delivering paper to the register stops of a printing press including an elongated support and clamping means at the ends of said support for fixing said support above a paper feeding conveyor, a ball support block having plural, spaced ball cavities therein, said cavities being formed through said support block from the upper surface thereof to the lower surface thereof, a retainer ball in each cavity, each cavity terminating in an opening through the bottom of said ball support block and of smaller diameter than the ball therein, second clamping means for supporting said support block from said elongated support and for adjustably positioning said ball support block along the length of said elongated support, said second clamping means including a pair of clamping members for embracing said elongated support, and resilient means for causing a resilient bias of said clamping members toward one another and for yieldingly holding said ball support block at a selected distance from said elongated support.

2. The structure of claim 1 wherein plural ball support blocks of the type recited are positioned along the length of said elongated support.

3. The structure of claim 1 wherein said ball support block includes a retaining plate swivelly mounted on

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the upper surface of said ball support block and overlying at least a portion of each cavity.

4. The structure of claim 1 wherein said resilient means includes a spring extending between one clamping member and said ball support block, said ball support block being coupled to the other clamping member.

5. The structure of claim 4 wherein said ball support block is coupled to said other clamping member by a post upstanding from said ball support block, said one clamping member being in the form of a clamping block, said clamping block slidably receiving said post, said other clamping member being in screw-threaded relation to said post to provide adjustment of said other clamping member toward and away from said ball support block, said spring being effective to yieldingly hold

said ball support block at a fixed distance from said clamping block as determined by the position of said other clamping member relative to said post.

6. The structure of claim 5 wherein said elongated support is in the form of plural parallel rails and said clamping block is grooved to receive said rails.

7. The structure of claim 1 wherein said first named clamping means includes a clamping block at each end of said support, each clamping block having a downwardly and outwardly inclined outer side surface whereby said support may be fixed to parallel support rods by positioning said support on said rods with said inclined surfaces in engagement with the sides of said rods at points below the centers of said rods.

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