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3,372,946

ROLLER SLIDES FOR TRAILERS

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2 Sheets-Sheet 1

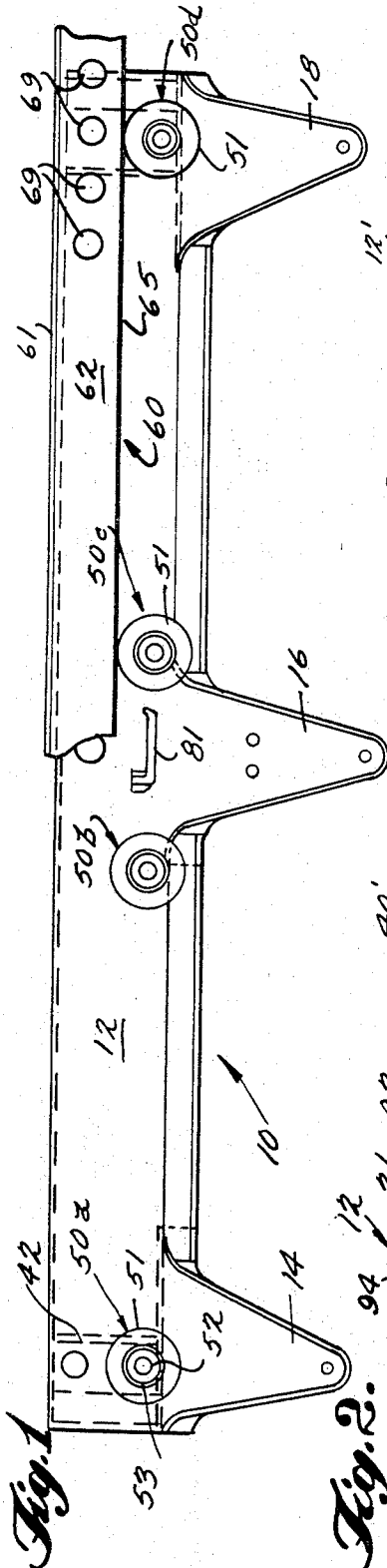
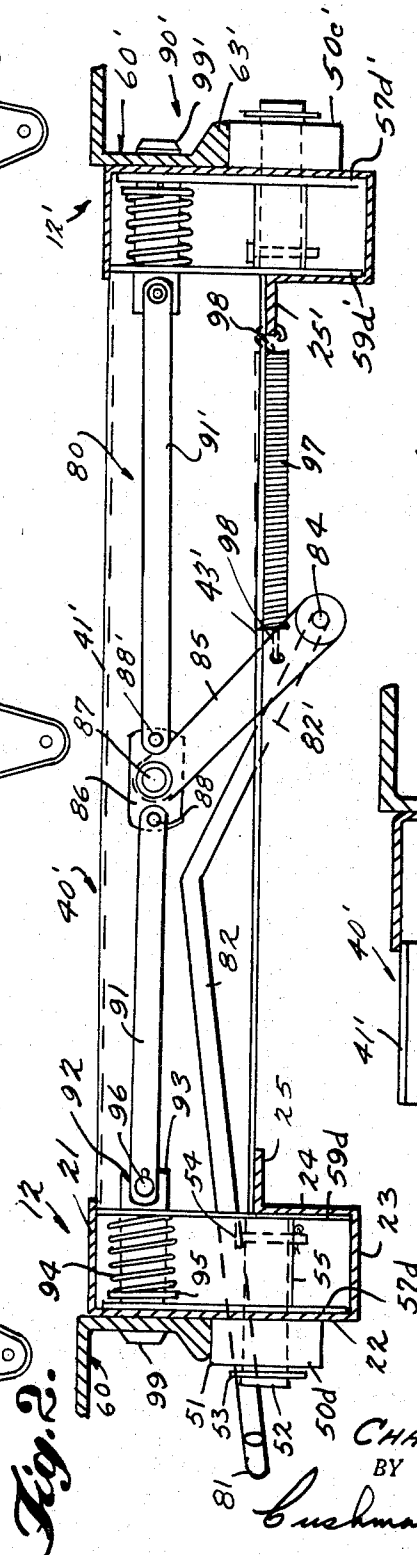


Fig. 6.

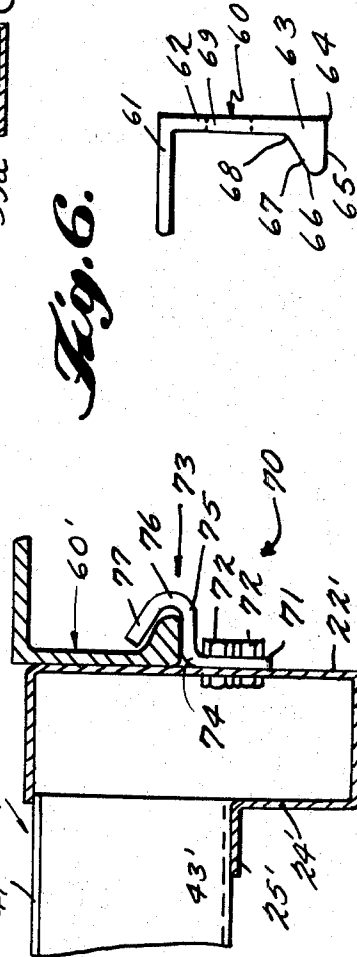


Fig. 5.

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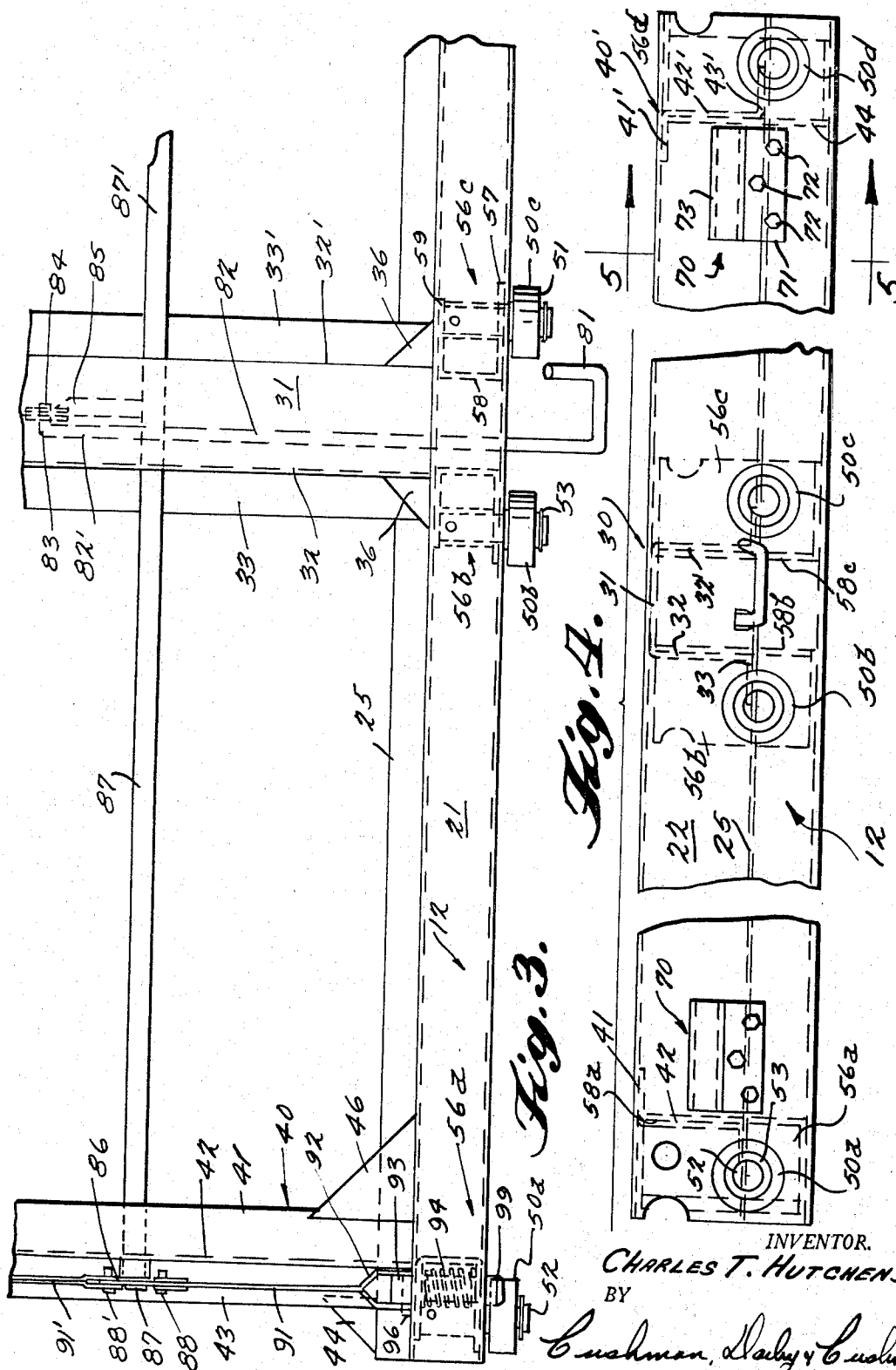
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ROLLER SLIDES FOR TRAILERS

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This invention relates to an improved roller slide assembly for tandem wheel vehicles that will provide improved means for adjustment of the subframe with respect to the vehicle body to obtain a properly balanced load condition. More particularly, this invention relates to improvements in body rail, roller assembly and puller assembly designs for a roller slide type tandem subframe that will provide an improved method of moving a slider back and forth beneath a trailer body.

Adjustable vehicle frames, adjustable running gear, adjustable slide assemblies and load equalizing devices, as they are sometimes called, are known in the art. Such assemblies are provided to compensate for widely varying load conditions of trailers. Frequently, trailers and the like vehicles cannot always be loaded equally throughout their length with the result that the loads bearing on the wheels supporting the vehicle are not always uniform and many prior devices have been devised to compensate for this unbalanced load condition.

Typically, the device for compensating an unbalanced load must be adjustable while the vehicle is loaded, for it is only at this time that the operator of the vehicle can determine the correct position for equally distributing the load. Since this variation of position must be accomplished when the vehicle is loaded, the means connecting the sub-frame to the vehicle must be adapted to allow such adjustment in a relatively easy manner while under the influence of a substantial load. Such means have taken the form of anti-friction devices, substantially cylindrical rollers rotatably mounted on one of the frame members and rollingly engaging the other member, and skids made of a suitable material. However, these prior art devices tend to collect ice, snow, mud and dirt which makes them hard to move. Some of the principal limitations of the known constructions include the exposure of bearing surfaces to road dirt and grime with consequent corrosion and "freezing" of the members so that shifting the running gear is found to be impossible after a short term on the road. Another limitation involves the mechanics and mechanism for shifting heretofore employed which have proven unsatisfactory due to their complexity or to a lack of attention to driver needs or inefficiency. The instant invention is designed to solve the problem of facile shifting of the running gear, and to eliminate the problem caused by any collection of foreign matter, such as snow, ice, mud and dirt.

It is therefore a principal object of this invention to provide an improved roller slide for tandem vehicles which will not freeze fast or suffer from the collection of foreign matter, but will work satisfactorily under normal operating conditions.

It is another object of this invention to obviate the defects of present and prior art constructions and provide an improved roller slide for tandem vehicles with improvements in body rail, roller assembly and puller assembly designs as an improved means for compensating of unbalanced loads.

It is a further object to provide a device of the character described which will be simple of manufacture, easy of maintenance, and provide a durable and long use life.

Other and further objects of this invention, together with an appreciation for the advantages thereof, will become increasingly apparent as this description proceeds.

Stated simply, the objects of this invention are achieved

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and many advantages realized by the provision of an improved tandem subframe that makes use of the new structural concept advanced in the copending application of Charles T. Hutchens, Ser. No. 464,166, filed June 15, 1965, now Patent No. 3,279,815. An improved roller assembly is mounted in this advanced subframe, with the rollers extending out from the sides thereof. Body rails of improved design are adapted to be aligned alongside this subframe to be received on the roller assembly. A simplified puller assembly is also provided to engage the body rails and subframe, and lock them together in an easy manner and without the use of power equipment.

Turning now to the drawings wherein like reference numerals have been used to denote the same or similar parts in the several figures:

FIGURE 1 is a side elevation view showing general details of the body rails, subframe and roller slide assembly according to the invention;

FIGURE 2 is a right end of a device like that shown in FIGURE 1, but slightly modified, and showing structural details;

FIGURE 3 is a top plan view, on an enlarged scale, of the roller slide and subframe of FIGURE 2 to show details of the puller assembly according to the invention;

FIGURE 4 is a side elevation of the device of FIGURE 3, showing subframe constructional details;

FIGURE 5 is a broken out sectional view taken along lines 5—5 in FIGURE 4, showing the relationship of the body rails and subframe assembly; and

FIGURE 6 is an end view of the improved body rail according to the present invention.

The improved subframe according to the present invention is indicated generally by the reference numeral 10 in FIGURE 1 and is comprised of longitudinal channel-shaped subframe slide rails 12 which may have suitably spaced spring hanger brackets depending therefrom such as the front hanger 14, the equalizer bracket hanger 16 and the rear hanger 18. It will be understood that the side rail 12 and spring hangers 14, 16 and 18, as well as the cross members to be described hereinafter, can be of the same design and fabricated in the same manner described and claimed in the abovementioned copending application of Charles T. Hutchens, Ser. No. 464,166, filed June 15, 1965, and the pertinent subject-matter thereof is incorporated herein by reference. The new concepts of this invention also have application to other subframe assemblies, and for this reason, the subframes depicted in FIGURES 2-5 are slightly modified and do not include integrally formed spring hangers.

As best shown in FIGURE 2, the subframe 10 is comprised of a pair of parallel horizontally disposed side rails 12 and 12' that are preferably mirror images of one another. Hence, the description of the left-hand rail will apply with equal force to the description of the right-hand rail. The left-hand side rail 12 may be formed from rectangular shaped metal plate that is bent, as is indicated in the drawing, to provide an outer facing, upper leg or upper surface 21, a vertical downward surface 22, a horizontal bottom surface 23, another vertical upward but inwardly facing surface 24 and a horizontal inwardly facing surface 25, all connected by smoothly rounded corners. The rail structure 12 is reinforced at selected points with the vertically aligned members 57 and 59 of the roller assembly, described hereinafter, which are welded to the vertical legs 22 and 24 and the upper surface 21. The rails 12 and 12' are connected rigidly together by means of several cross rails such as the central cross rail 30, the front cross rail 40 and the rear cross rail 40' (see FIGURES 3 and 4).

Turning to FIGURES 3 and 4, the cross rail 30 is preferably obtained from another rectangular shaped metal

plate which is bent into an inverted U-shaped configuration with an upwardly facing surface 31, depending sides 32 and 32', and outwardly facing bottom flanges 33 and 33', all connected by smoothly rounded corners. The cross rail 30 is then connected to the rails 12 and 12' at each end and reinforced by a pair of horizontally aligned plates 36. All joints are preferably welded. The front and rear cross rails are each substantially S-shaped, with an upper inwardly facing leg or surface 41, a vertical downward surface 42 and a lower horizontally disposed and outwardly facing flange 43. The front and rear cross rails are preferably reinforced by horizontally aligned plates 44 and 46 which are welded to the joint of the cross rails with the side rails 12 and 12'.

Returning to FIGURES 1 and 2, it will be seen that the subframe assembly is provided with a plurality of roller assemblies, indicated by the reference numeral 50. While there may be any number of the roller assemblies, it is preferred to provide four such assemblies 50a, 50b, 50c and 50d. Each roller assembly has a roller body 51 journaled on a suitable axle on mounting means 52 and held on the axle by a suitable collar 53. The axle 52 passes through a suitable opening in the side rail outside face 22 and is journaled in an internal bushing 55 and is held therein by a clevis pin and cotter pin, indicated at 54. As best shown in FIGURE 3, the roller assembly 50 includes a substantially U-shaped vertically aligned U-frame or reinforcement 56 having an outer wall 57, a transverse wall 58 and an inner wall 59. Each assembly 56 is welded to within the rail 12, as shown in FIGURE 2, to provide a reinforcement to the rail surfaces 21, 22, 23 and 24. A suitable opening is of course provided in the reinforcement wall 57 to provide passage for the axle 52 and the bushing 55 is preferably welded within each reinforcement 56 before assembling within the channel-shaped side rails 12 and 12'.

It is intended that a trailer body or truck body be mounted on the subframe assembly 10 by using the improved body rails 60 and 60', shown in the several figures. As is known in the art, the body rails 60 are secured to the underbody of a truck or trailer and the subframe is then assembled in cooperation with the body rails. According to the present invention, the body rails 60 are substantially L-shaped, having an upper horizontally disposed leg 61 and a downwardly disposed leg 62 leading to a foot portion 63. The foot portion 63 is defined by an inwardly curved heel 64, a downwardly facing presser surface 65, and a toe portion which curves at 66, and then slopes gently upwardly and inwardly at 67, finally curving back into the leg 62 at 68. A plurality of openings are then provided, as indicated at 69, to cooperate with the shaped nose 99 of the stop lug or stop bar described hereinafter.

As shown in FIGURE 1, the downward presser surface 65 of the body rail is positioned to ride and roll on the upper surface of each of the roller bodies 51. The body rail is also held in alignment with the subframe assembly and the rollers 51 by means of the hold-down clips indicated generally at 70 and defined by a downwardly facing leg 71 that is held to the beams 12 and 12' by means of suitable hex nuts, lock washers and hex head cap screws indicated at 62. The hold-down clip then curves upwardly at 74 to the channel portion 73 that is defined by the bearing surface 75 and a toe portion that curves upwardly at 76 and then curves rearwardly at 77.

The position of the body rails 60 with respect to the subframe and side rails 12 and 12' is controlled by means of the manual puller and stop bar assembly, indicated generally at 80. As best shown in FIGURE 1, the puller assembly has a suitably shaped handle at 81, formed with an upwardly sloping and inwardly facing control rod 82 that is bent again to slope downwardly at 82' and terminates in a hook 83 which is pivotally received in a suitable collar 84 of the crank lever 85. The crank lever 85 is mounted centrally on the crank rod 87-87' shown in the top plan view of FIGURE 3, which crank rod turns the

cranks 86 and 86' (not shown) which are disposed at each end of the subframe outermost from the cross rails 40 and 40'. Control or puller arms 91 and 91' are pivoted to the crank 86 at 88 and 88'. Hence, outward movement of the handle 81 will turn the crank lever 85, crank rod 87-87' and crank 86 all in the same direction. This movement will cause inward movement of both puller rods 91 and 91' and withdraw the stop bars or lugs 93 and 93' described hereafter. Turning to FIGURE 3, it is seen that the outward ends of the control arms 91 and 91' are connected at their clevis ends 92 to the body of a stop lug or stop bar 93 by means of the clevis pin and cotter pin, indicated at 96. The stop lug 93 is biased within the U-frame reinforcement 56 by means of a tension spring 94 and collar 95. The lug 53 passes through suitable openings in the beam side 22 and the U-frame sides 57 and 59, and is provided at its outermost end with a shaped nose 99 that coacts with any predetermined opening 69 in the body rail 60. In this manner the position of the body rails 60 can be adjusted with respect to the subframe, by sliding therealong to any point where the holes 69 are aligned with the lug noses 99. A plurality of such points are pre-selected according to the design of the present components, to permit the greatest possible utility in the field.

As an example of a construction according to the present invention, a subframe and roller slide may be fabricated with the lug openings 69 about one and three-quarter inches in diameter, equally spaced about four inches apart on center lines about two and one-half inches below the top of the body rail. The body rail itself may be about five inches overall height, with the top leg about three and one-half inches wide and the foot at the bottom being about one and one-half inches overall width. The equalizer bracket is equally spaced with respect to each hanger by a distance of about forty-three and one-half inches, although greater lengths may be employed if desired, for widespread tandem assemblies. The preferred roller base is about forty-two inches wide and the body rails are spaced about one-eighth inch further apart. The overall assembly according to the present invention, for standard tandems may measure about one hundred four inches in length, while the beams 12 are about ten inches overall height, with the body rail rising about five-eighths inch thereabove. A greater overall length would be employed with a widespread tandem construction.

It is preferred to fabricate the subframe and body rail assembly separately, so that the roller slide assembly according to the present invention can be adapted to existing units by first clamping the body rails in position beneath a vehicle body and then placing the roller subframe between the body rails and extending the pins or lugs 93 to engage the holes 69 of the body rails. Thin shims may be used to space the body rails from the side rails 12 of the subframe, after which the body rails should be welded securely to the truck or trailer body from front to rear. The entire assembly will operate freely after the shims are removed.

From the foregoing description it is apparent that the objectives of the invention have been satisfied, and means have been provided for adjustably connecting the subframe and main frame of a vehicle which will allow simple and easy relative movement therebetween. These means will allow simple and low friction movement between the subframe and main frame; but will not freeze fast or suffer from collection of mud or dirt. Moreover, these means will operate satisfactorily under all conditions.

It is to be understood that while the preferred embodiments of this invention have been shown and described, changes and modifications can be made therein by those skilled in the art since this description is illustrative only and not for the purpose of rendering this invention limited to the details illustrated or described except insofar as they have been limited by the terms of the following claims.

What is claimed is:

1. An adjustable tandem subframe comprising: a pair of horizontally disposed channel-shaped support members lying in parallel vertical planes; a plurality of spring mounting brackets connected to each channel-shaped support member and depending therefrom; a plurality of horizontally aligned rollers projecting from the outside surface of each support member, each roller being secured on a mounting means for rotation in a vertical plane about an axis fixed to the corresponding support member, said mounting means having an inner end affixed within one of said channel-shaped support members, the rollers on each side of said subframe being adapted to engage a vehicle body frame angle member and support the same in sliding relationship with respect to said subframe; and stop means carried by said subframe and adapted to slide through said channel-shaped support members and engage said vehicle body frame angle members.

2. An adjustable subframe assembly for vehicles comprising in combination: a pair of parallel beams having inverted L-shape cross sections with one leg of the "L" extending outwardly and lying in an uppermost horizontal plane, and the other leg of the "L" extending vertically downwardly and having a bulb-shaped protrusion on the lower end thereof; a pair of channel-shaped subframe members, each being disposed inwardly of and in alignment with one of said L-shaped beams; cross frame members connecting said channel-shaped members in parallel alignment and defining therewith a rigid subframe; a plurality of spring mounting brackets depending from each channel-shaped member; a plurality of horizontally aligned rollers projecting from the outside surface of each channel shaped member, each roller being mounted for rotation in a vertical plane about an axis fixed through the channel-shaped member, the rollers on each channel-shaped member being adapted to engage the bulb-shaped protrusion of the L-shaped beam in alignment therewith, and to support the L-shaped beams in sliding relationship with respect to the subframe; and stop means carried by

said subframe and adapted to slide through said channel-shaped members to engage said L-shaped beams.

3. The combination of claim 2 wherein the bulb-shaped protrusion resembles a foot in cross section with straight heel portion in alignment with the downwardly extending leg of the "L"; a flat bottom portion connected to the heel portion by a smooth curve and providing a flat bearing surface for engagement by said rollers; and a toe portion having a first relatively sharp upward curve and a gently rising rearward slope that merges back into said downwardly extending leg.

4. The combination of claim 2 wherein said stop means comprises a spring loaded lug mounted through holes in each channel-shaped subframe member and adapted to slide thereout of and engage a predetermined opening in the corresponding downwardly extending leg of said L-shaped beams; a crank and a rod pivoted at each end and connected to one of said lugs; a crank lever for turning said crank about a central axis to thereby control the movement of said connecting rods and lugs; and manual actuating means to move said crank lever.

5. The combination of claim 4 wherein said crank lever is spring loaded and wherein the manual actuating lever passes through one of said channel-shaped members, curving first upwardly toward the fulcrum of the crank, and then downwardly to be pivoted in the end of the crank lever, below the cross frame members.

References Cited

UNITED STATES PATENTS

2,753,064	7/1936	Lesser	280—80
2,900,194	8/1959	De Lay	280—34
3,085,816	4/1963	Tantlinger et al.	280—80
3,146,000	8/1964	Holzman	280—81
3,181,914	5/1965	Humes	280—80 X
3,235,285	2/1966	Tennenbaum et al.	280—81
3,314,689	4/1967	Hogan	280—81

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