

Dec. 9, 1958

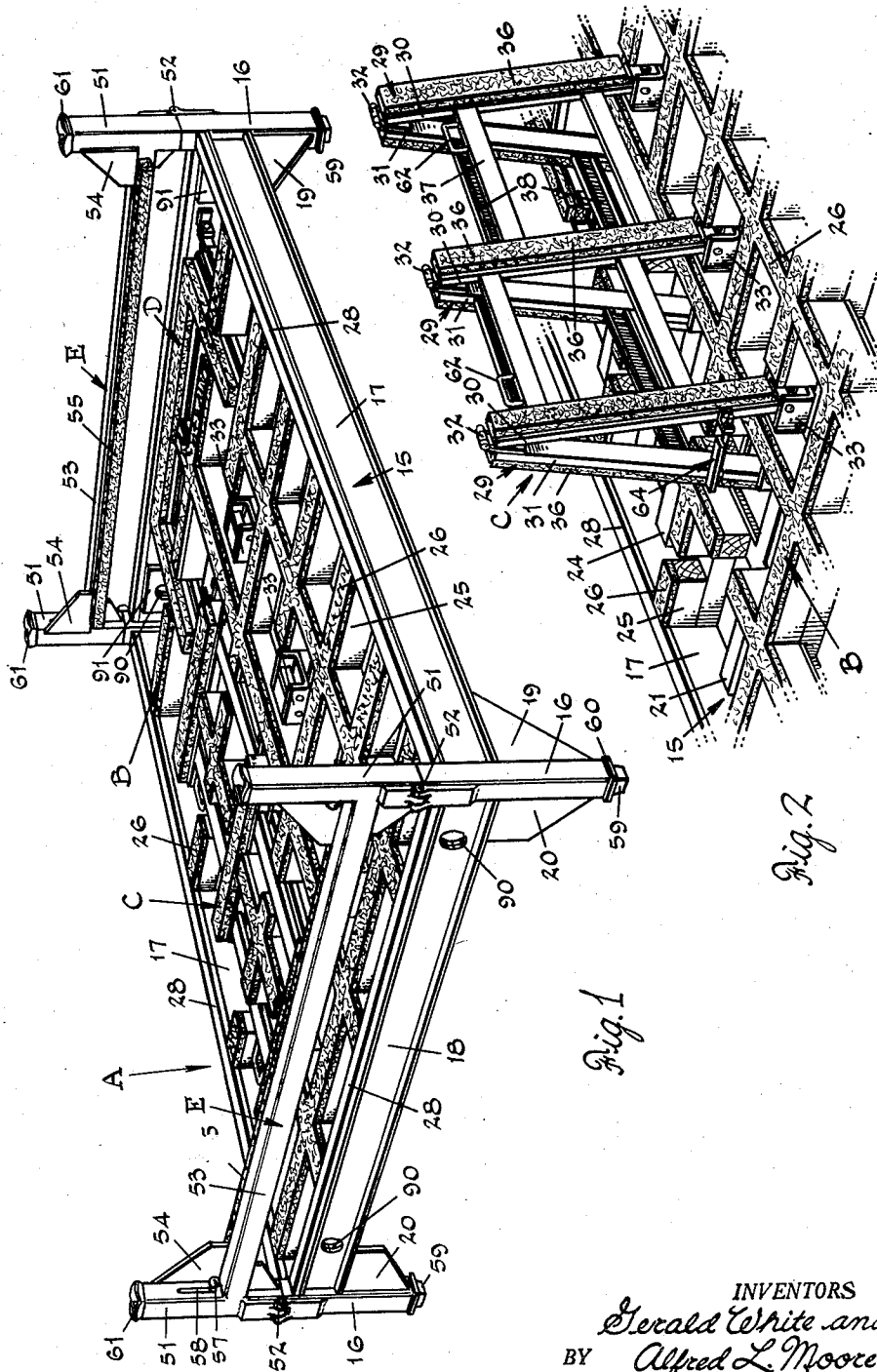
G. WHITE ET AL

2,863,566

SUPPORT DEVICE FOR SHEET MATERIALS

Filed March 12, 1954

5 Sheets-Sheet 1



INVENTORS
Gerald White and
BY Alfred L. Moore
Robb & Swope
ATTORNEYS

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G. WHITE ET AL

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SUPPORT DEVICE FOR SHEET MATERIALS

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5 Sheets-Sheet 3

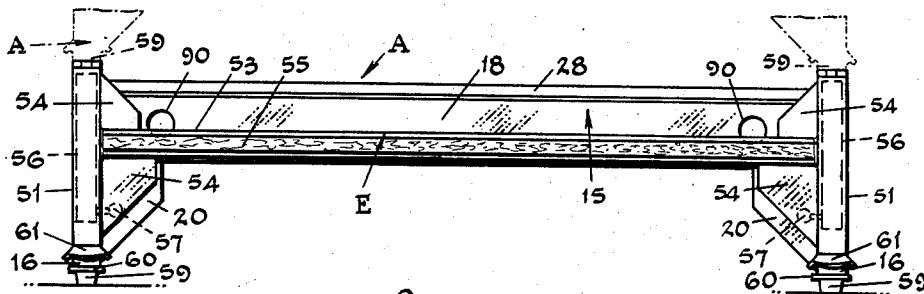


Fig. 5

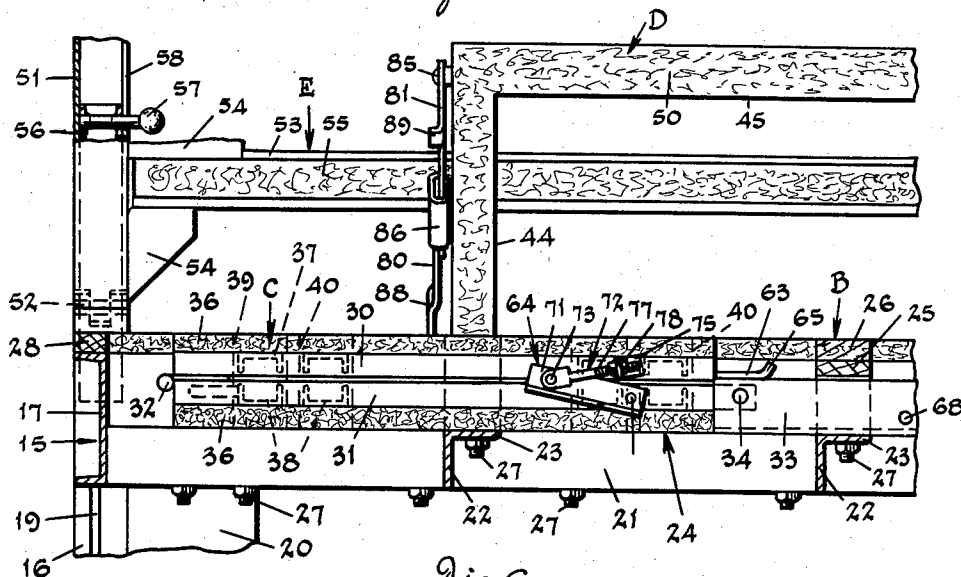


Fig. 6

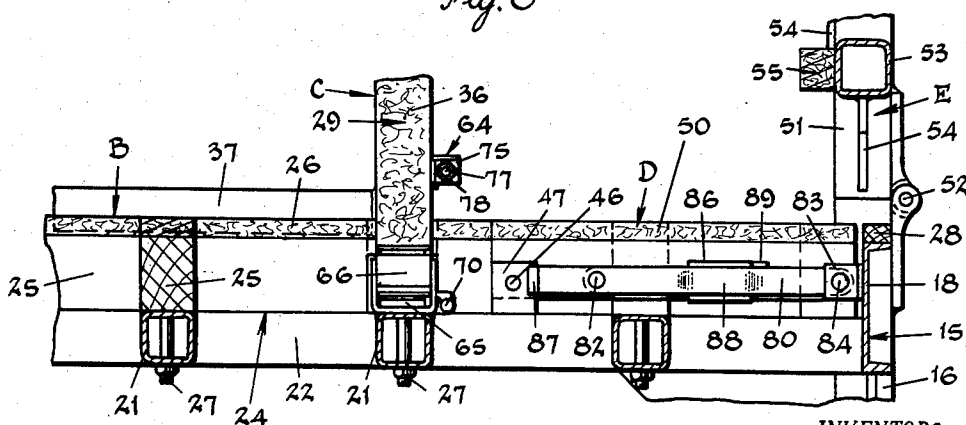


Fig. 7

INVENTORS
Gerald White and
BY Alfred L. Moore
Hobbs & Swope
ATTORNEYS

Dec. 9, 1958

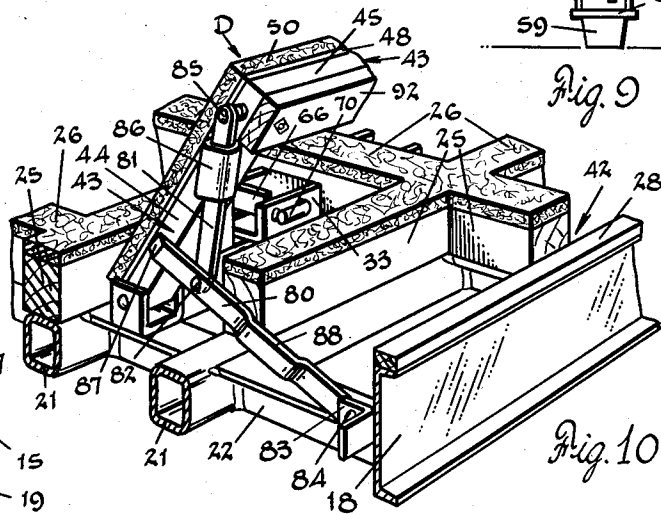
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SUPPORT DEVICE FOR SHEET MATERIALS

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5 Sheets-Sheet 4



Dec. 9, 1958

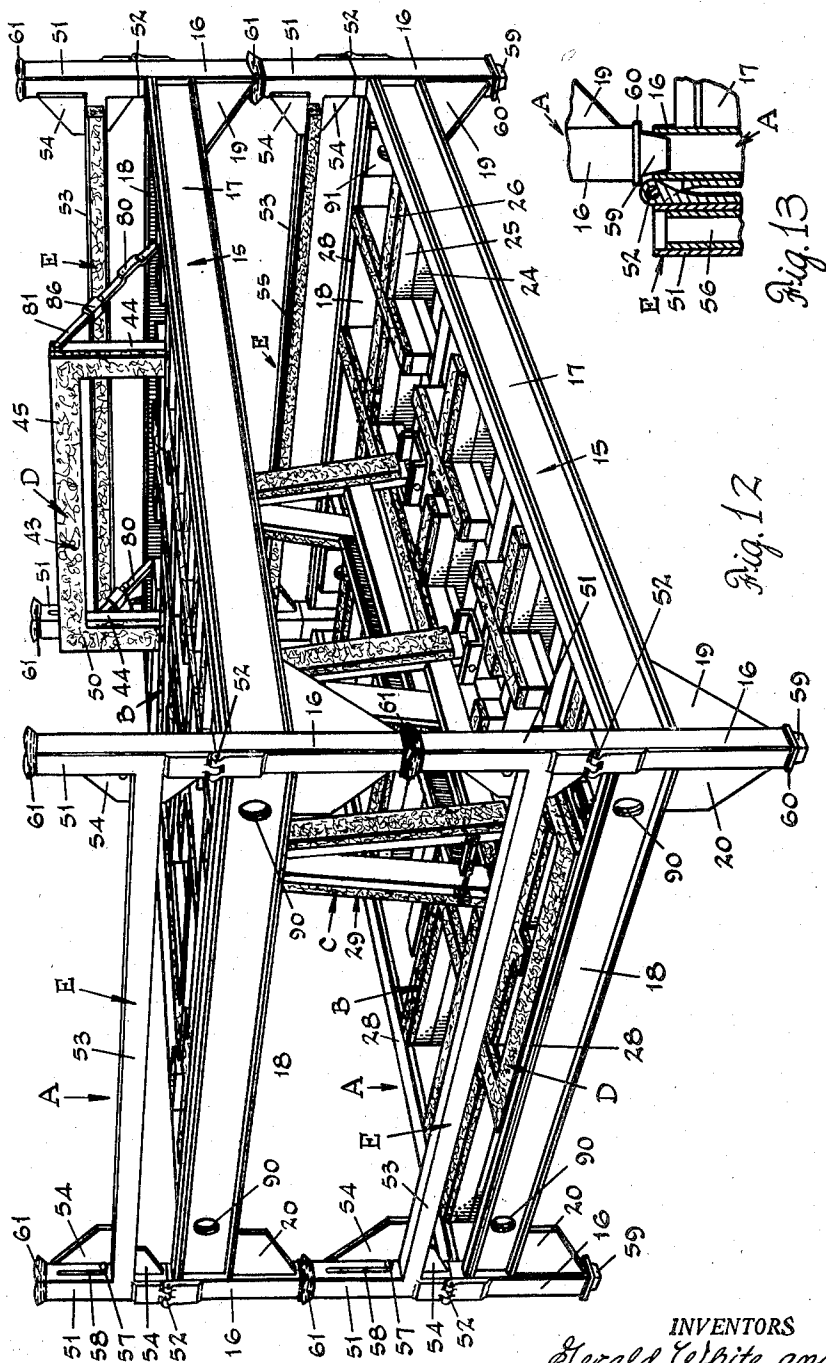
G. WHITE ET AL

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SUPPORT DEVICE FOR SHEET MATERIALS

Filed March 12, 1954

5 Sheets-Sheet 5



INVENTORS
Serald White and
BY Alfred L. Moore
Nobbe & Swope
ATTORNEYS

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2,863,566

SUPPORT DEVICE FOR SHEET MATERIALS

Gerald White, Rossford, and Alfred L. Moore, Maumee, Ohio, assignors to Libbey-Owens-Ford Glass Company, Toledo, Ohio, a corporation of Ohio

Application March 12, 1954, Serial No. 415,874

13 Claims. (Cl. 211-41)

The present invention relates broadly to conveying equipment for sheet materials such as glass or the like. More particularly, it has to do with an improved transfer device that is equally well adapted for the carrying of both flat and curved sheets or plates of glass or the like and which can also be easily altered structurally to facilitate the conveying or storage thereof when not in actual use.

It is therefore an important object of the invention to provide a transfer device which is adapted to be readily converted to support either flat or curved sheet materials. The device may thus be employed to great advantage in the transporting of sheets of relatively large dimension to one area or location for processing, while flat, and to be then converted so that sheets, having been bent or otherwise shaped to a desired curvature, can be conveyed therefrom.

Another object of the invention is to provide a transfer device of the above character upon which a plurality of sheets, either flat or bent, can be safely and conveniently arranged and transported. Due to the novel features of its construction, the device is adapted to support a relatively large number of sheets and when so loaded to be conveyed either singly or in stacked arrangement with similarly constructed transfer devices.

Another object of the invention is to provide, in a transfer device of the above character, means for rigidly stacking the same with respect to a second transfer device to thereby enable the safe transporting of an increased number of sheets during a single transfer operation.

A still further object of the invention is to provide a transfer device which is adapted to be arranged in vertical relation to others of the same character when unloaded, thereby permitting them to be transported and/or stored in rigidly stacked relation to one another.

Other objects and advantages will become more apparent during the course of the following description when read in connection with the accompanying drawings.

In the drawings, wherein like numerals are employed to designate like parts throughout the same:

Fig. 1 is a perspective view of a transfer device constructed in accordance with the invention;

Fig. 2 is a fragmentary perspective view of the transfer device when used to carry flat sheets of glass or the like;

Fig. 3 is a plan view of the transfer device;

Fig. 4 is an end elevational view of the transfer device and with the end frames thereof in the uppermost position;

Fig. 5 is a similar end view of the device with the end frames in their lowermost position;

Fig. 6 is a transverse sectional view of the transfer device taken substantially along line 6-6 of Fig. 3 and showing one of the movable sections in its erected position;

Fig. 7 is a longitudinal sectional view of the transfer

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device taken substantially along line 7-7 of Fig. 3 and showing the other of the movable sections in its erected position;

Fig. 8 is a transverse sectional view when the device is arranged as shown in Fig. 2;

Fig. 9 is a longitudinal sectional view of the device when it is adapted to carry curved sheets of glass or the like;

Fig. 10 is a fragmentary perspective view of the manner of erecting one section of the device for carrying curved sheets;

Fig. 11 is a view of a corner of the transfer device when an end-frame thereof is to be lowered.

Fig. 12 is a perspective view of two transfer devices in stacked relation, and

Fig. 13 is a cross-sectional detail view of a second manner of stacking the transfer devices.

Referring now more particularly to the drawings, there is disclosed in Fig. 1 a transfer device constructed in accordance with this invention and designated in its entirety by the letter A. The transfer device, which will be hereinafter referred to as a buck, is provided with a suitably padded deck or floor B to support the lower edges of sheet materials, such as sheets or plates of glass or the like, without damage thereto. The floor B is provided with movable sections C and D which, as shown in Fig. 1, are so located that the padded surface thereof is in a substantially level plane with the stationary portions or sections of the floor. However, as shown in Figs. 2 and 8, the movable section C may be easily erected to form a centrally disposed wall, longitudinally arranged within the buck A and having opposed, convergently angled sides and against which flat sheets can be arranged. As shown in Figs. 6 and 9, or in the upper buck of Fig. 12, the section C has been returned to the horizontal plane of the floor B while the movable section D has been erected for the purpose of supporting curved sheets thereagainst. The movable section D when erected, is located in a generally transverse position within the buck and adjacent one of the ends thereof. When either the section C or the section D is arranged in its erected position, the transfer device or buck is also adapted to be raised either by a crane hoist or the platform or prongs of a conventional motor hoist to facilitate safe carrying of the glass sheets as will be more fully hereinafter set forth.

Essentially, the transfer device or buck A comprises a substantially rectangular frame or body 15 that is supported by legs or standards 16. The sides of the body 15 are formed by structural channels 17 while the ends thereof are similarly formed by channels 18, said channels all being secured as by welding to the standards 16 at the corners of the body 15. The standards and channels may be reinforced by gussets 19 and 20.

The deck or floor B of the transfer buck is carried by the body 15 and a base therefore is provided by a plurality of bars 21 of tubular cross-section and by structural angles 22 that are arranged in a lattice or criss-cross relationship and at substantially right angles to one another. The bars 21 are located in parallel relation with the end channels 18 and secured at their ends to the inner surfaces of the channels 17 as by welding. The angles 22 are then arranged between and secured, as by welding, to the vertical side walls of the tubular bars 21. While the angles 22 are thus only of sufficient length to bridge the space between the adjoining bars 21, in their continuity and on the surfaces of the substantially horizontally disposed legs 23, they afford a plurality of longitudinally located surfaces comparable in width to the width of the transversely arranged bars 21. The base 24 of the deck or floor B is accordingly provided by the horizontal legs

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23 of angles 22 and the horizontally disposed upper surfaces of bars 21.

As herein shown, actual surface of the floor B is made up of wood spacer blocks 25 covered on their upper surfaces by strips 26 of felt or other suitable padding material. The blocks, of various length, are secured on the legs 23 of angles 22 and the bars 21 by means of nuts and bolts 27, Figs. 8 and 9, regularly spaced along said structural members. Preferably the blocks are positioned by the bolts 27 on the bars and angles and the felt strips then cementiously affixed to the upper surfaces thereof. The blocks are also of sufficient height to locate the upper surfaces of the felt strips 26 in a common, substantially horizontal plane with wood rails 28 carried on the upper surfaces of the channels 17 and 18, as by nuts and bolts, to protect the edges of the glass sheets from damage as they are loaded. A supporting surface for glass sheets is thus made up of regularly spaced, substantially continuous strips of felt or other suitable padding material, located both longitudinally and transversely within the rectangular frame or body 15. Now, according to this invention, certain of these felt surfaces are interrupted or are movable from the common plane to form integral parts of the movable section C or D.

Generally speaking, the section C structurally resembles a capital letter E while the section D resembles an inverted capital letter U. The three legs of the E are located so as to overlie portions of bars 21 when the section C is in the "down" or horizontally disposed position and similarly the legs of the U are arranged to form continuations of the felted surfaces of the angles 22 when the section D is in its "down" or horizontally disposed position. For this purpose and with particular reference to Figs. 2 and 8, it will be seen that the legs 29 of section C are formed by pairs of hingedly joined channels 30 and 31 that are arranged with the webs thereof in opposed relation and connected at one end by hinges 32. The legs 29 are swingably supported by brackets 33 secured as by welding to alternately located bars 21. More especially, the end of each channel 31 opposite hinge 32 is pivotally carried on a pin 34 secured at its ends in the walls of brackets 33.

Each channel 30 or 31 is equipped with a filler block of wood 35 covered by felt 36. And the combined thicknesses of the felt strips 36, the blocks 35 and the webs of channels 30 and 31 are substantially equal to the height or thickness of the blocks 25 and the felt strips 26 thereon. The related channels 30 and 31 of each leg 29 are suitably interjoined and braced by pairs of channels 37 and 38. When the movable section C is in the "down" position, the surfaces of felt strips 36 carried by channels 30 will lie in the plane of the strips 26 when supported on the bars 21 as will be seen in Fig. 6.

As herein disclosed, the bars 21 are uneven in number and the legs 29 of section C arranged to align with the "even" bars as will be seen in Fig. 3. The felt covering 26 on the first bar 21, from the left-hand side of the figure, may thus be continuous. The next strip 26 will be interrupted at one side of the centermost angle 22 to accommodate one end of a bracket 33 and on the opposite side of said angle will be replaced by the felt covering 36 of the first leg 29 of the section C. The covering of the next bar 21 will be substantially continuous; provision being made therein as at notched areas 39 for the channels 37 and 38 located between the first and second legs 29. Here it will be noted that the channels 37 and 38 between the second and third legs 29 are staggered in position from the first pairs of said channels for a purpose to be hereinafter more fully disclosed. The fourth and sixth bars 21 are covered as in the case of the second and the fifth bar similarly to the third, exception being made as to the location of the notched areas 40. The covering of the remaining and last bar 21 is notched as at 41 to freely receive the leg portions of the movable section D.

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Considering the lowermost angle 22 in Fig. 3 as the first, the felt cover 26 thereon will be continuous from an end of the buck to the sixth bar 21. Rightward thereof, the continuity of the padded surface is provided by the similar surface of the leg portions of the section D. The covering of centermost angle 22 is notched at 42 at one end of the buck to receive the web of section D while the covering of the third angle is identical to the first and for the same reason.

The movable section D is formed by a U-shape, channel frame 43 having leg portions 44 and web 45 and when said section is in its down position, the web 45 thereof will be disposed in parallel with a closely adjacent end channel 18. At the extremities of the legs 44, the section D is swingably mounted on the first and third angles 22 by means of pins 46 fixedly carried in brackets 47 secured as by welding on said angles. The U-shape or channel frame 43 has filler members 48 that are secured therein by nut and bolt connections 49 and covered by felt or padding material 50.

The ends of the transfer buck A are provided with end-frames E that are adapted to be disposed in a substantially rigid, up-right position to afford end barriers when the buck is loaded with glass sheets and also to enable the buck to safely support a second buck which may be similarly loaded as is shown in Fig. 12. The end-frames E are also swingably mounted so as to be disposed in substantially parallel relation with the end channels 18 and the standards 16 thereby materially reducing the overall height of the buck and permitting several to be placed in stacked relationship when empty, as is shown in Fig. 5. This is exceedingly advantageous since it allows a greater number of bucks to be carried when properly loaded and safely stacked thereby increasing the number of glass sheets that can be transported at one time. Also, when the transfer bucks are unloaded or empty, they can be similarly arranged for conveying.

The end-frames E may thus constitute vertical extensions of the standards 16 and, for this purpose, tubular sections or posts 51 are connected to the upper ends of standards 16 by means of relatively heavy hinges 52 and are interconnected transversely of the body 15 by a tubular bar 53. The bar 53 and posts 51 may be reinforced by gussets or plates 54. The inwardly disposed surfaces of the bars 53 are covered by thick strips of felt 55.

In order that the end posts 51 will be rigidly sustained in a vertical position and in substantial alignment with the standards 16 a tubular locking member 56 is provided to slidably interfit within each post 51 and its associated standard. Normally, the locking member is so disposed, as shown in Fig. 9, that the joint of each hinge 52 will be located approximately midway between its ends. To support the locking member in this position and to effect a rigid structure, a pin or handle 57 is provided, the handle being movable within slots 58 formed in an inwardly facing wall of each post 51. As best seen in Fig. 6, the pin 57 is secured at its inner end to the tubular member 56 by welding the same to the opposed inner surfaces of said member.

When the handles 57 are carried in the lower ends of the slots, as in Fig. 9, the associated locking member 56 will be suspended between and within the post 51 and standard 16 to prevent any swinging action at the hinge 52 and thereby maintain the same in a vertically aligned relation. However, when the handles are moved to the upper end of slots 58, the members 56 will be carried upwardly into the posts 51 to permit the end-frames E to be swung outwardly and downwardly as is shown in Fig. 11, until the posts 51 are located in substantially parallel relation with the standards 16.

The standards 16 and associated posts 51 are equipped in their respective lower and upper ends with especially formed members which are adapted to readily interfit and thereby effect a rigidly supported relation between several transfer bucks when the same are arranged in the stacked

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relation of Fig. 12 or even when four, five or more are vertically so placed in tiers. The lower end of each standard 16 is thus equipped with a conical, four-sided foot 59 having an upper rim or flange 60. The foot 59 is adapted to interfit with or nest in a four-sided socket or cup-shaped member 61 that is secured in the upper end of each tubular post 51. As shown in Fig. 9, the surfaces of the foot 59 of the upper buck A, indicated in phantom line, nest with the complementary surfaces of the cup 61 of the lower buck A; however, when the end-frames E are located in the lower position of Fig. 5, the feet 59 of an upper buck are equally well adapted by reason of their convergently disposed surfaces to enter and be received in the open, upper end of the tubular standards 16 as is shown in Fig. 13.

It will thus become apparent that the padded surface of floor B of the transfer buck A is formed by felt strips 26 stationarily disposed on bars 21 and angles 22, the felt strips 36 of the movable section C and the felt covering 50 of the section D and when said sections are in their "down" or horizontally disposed positions, the surface will appear as is shown in Figs. 1 and 3. To carry a plurality of flat glass sheets on the buck, the end-frames E are swung upwardly to the position therein shown during which operation the tubular locking members 56 slide downwardly until movement is arrested by engagement of handles 57 in the lower ends of slots 58. The movable section C is now raised to its erected position as shown in Figs. 2, 7 and 8.

For this purpose and convenience of moving the section readily, handles 62 are provided on the uppermost bracing channels 37 located between the legs 29. When one or the other of handles 62 is engaged, the section C is bodily swung upwardly as the channels 31 pivot about the axes of pins 34 in brackets 33. Then as the section is moving, as shown in phantom line in Fig. 8, toward its erected position, the pairs of channels 30 and 31, forming the legs 29, open on the hinges 32.

In order to support and sustain the section C in its erect position, L-shaped plates 63 are attached to the free end of channels 30 and bracing members 64 are pivotally carried by the outermost legs 29. Each plate 63 is fixedly secured to the web of its associated channel 30 and so that the upturned end 65, during swinging of the legs 29, be directed toward and into sliding engagement with a deflector plate 66, formed as a part of each bracket 33 in the end opposite pin 34. The deflector plates 66 are substantially vertically positioned to guide the plates 63 downwardly and until the ends 65 thereof will pass beneath the lower edge. A locking device 67 is positioned behind each deflector plate to loosely engage the rear surface of each plate 63. The lock 67 comprises a shaft 68 journaled in the walls of each bracket 33 and having fixedly secured thereto, between the walls, a bar 69. At one outer end, the shaft 68 is bent at substantially a right angle to provide a handle 70. When raising the section C, the shafts 68 are swung to move the attached bar 69 thereon to a position as shown by phantom line in Fig. 8. When the section is erected, the shafts are reversely swung to bring the ends of bars 69 to a position adjacent the rear surfaces of the plates 63. The locks 67 are substantially "free" from actual contact with the surfaces of plates 63 but the proximity of the ends of bars 69 to said surfaces is sufficiently close as to prevent undue movement.

The channels 30 and 31 of the legs 29 are now supported so that they will be inclined in substantially the form of a letter A and at an equal, converging angle to the perpendicular. To further "lock" said legs in this relation, the braces 64 are provided. These comprise two members 71 and 72 pivotally joined by rivet 73. The member 71, in the form of an angle, is pivotally supported on a wall of associated channel 31 by rivet 74. The member 72 is adjustable in construction and is formed by an angle 75 pivotally carried on one wall of the associ-

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ated channel 30 by rivet 76 and an eyebolt 77 joined to the angle 71 by rivet 73 and located in the opposite leg of angle 75 by means of nuts 78. When the legs 29 are in their erected position, the rivets 73, 74 and 76 are axially aligned and the component members of braces 64 operate to rigidly maintain the channels 30 and 31 in their angular relation. However, in lowering the legs 29 of section C, the members 71 and 72 fold elbow-wise to assume related positions as shown in Fig. 6.

While the section C is positioned to support flat sheets as indicated at S, in Fig. 8, the lower edges thereof will be supported on the surface of the floor B provided by the felt strips 26 and the felt covering 50 of the section D. And where it appears that no support will be provided as at the notched areas 39 and 40, it will be remembered that these notches are located in staggered relation to accommodate the pairs of bracing channels 37 and 38 of the section. Thus when flat glass sheets are loaded on the buck, their lower edges will be supported on areas of felt longitudinally aligned with the notches 39 but will be unsupported over the notched areas 40 and vice versa. On the opposite side of the movable section C, the covered surfaces of the bars 21 and angles 22 is continuous.

When the section C is not erected, the section D, if desired, may be moved upwardly to and braced in its upright position as shown in Fig. 9 at or adjacent one end of the frame 15. As previously set forth, the section D, formed by the channel frame 43, is supported at the ends of the legs 44 on pins 46 in brackets 47. The frame 43 is sustained in its upright or erected position by means of pairs of links 80 and 81 interjoined by rivets 82. The links 80, at one or their opposite end, are pivotally supported on the adjacent end channel 18 by angles 83 supporting rivets 84. The free end of each link 81 is similarly pivotally supported on the wall 44 of frame 43 by a rivet 85. The links 80 and 81 are maintained in an aligned position by rectangularly shaped slides 86 nominally carried by the links 81 but having sufficient width between the opposed inner surfaces to also receive the end portions of links 80. In order to move the slide freely, the end portion 87 of each link 80 outwardly of the rivet 82 is chamfered and between the rivet 82 and rivet 84, the links 80 are shaped to afford a recessed area 88.

During erection of the section D, as is illustrated in Fig. 10, the slides 86 are moved along the links 81 to clear the ends 87 of the links 80. Then, when the links 80 and 81 are aligned, as shown in Fig. 9, the slides are slipped over the chamfered ends 87 and along the combined links 80 and 81 until they engage the rivets 82. Accordingly, when so positioned, the slides 86 restrict movement of the links and the section D bodily from the erected position in which it will support bent sheets of glass or other materials as indicated at S'.

To lower the section D, the slides 86 are moved outwardly of the link end portions 87 and the links 80 and 81 are moved elbow-wise until the section is lowered and the links are positioned as shown in Fig. 7 at which time slides 86 will be received in recessed areas 88 of links 80. If desired to limit outward movement of the slides 86 on links 81, the same may be provided on one edge with lugs 89.

Since it is quite obvious that the transfer buck can be raised and carried by the positioning of the platform or prongs of a conventional motor hoist truck beneath the channels 17 or 18 of the frame 15, it will also be seen that by the provision of holes 90 in the channels 18, the buck can be as readily lifted by a crane by means of conventional hoisting hooks. To reinforce the structural web of the channels 18, plates 91, provided with registering holes, are welded to the rear surface of said channels.

In accordance with the embodiments of this invention, it now becomes possible to materially increase the number of sheets carried or transported at one time. For

instance, and due to not only the structural character of the buck but as well to the size thereof, it has been proven that twice as much sheet material, such as glass, can be loaded on one buck for safe conveyance. In addition, by reason of the novel features of its construction, the transfer device or buck is adapted to support, or be supported on, another so that at least one additional buck can be superimposed one above the other and safely transported when loaded. This is a vital factor in productive use since the actual amount of transported material is greatly increased. In fact, the number of bucks that can be stacked in a vertical tier is limited only by the safety factor of the support and/or highway restrictions. Also when the bucks are not loaded, the end-frames thereof are lowered to the end that as many as eight bucks can be safely stacked for storage.

Thus when a transfer buck A is intended to carry flat sheets as for example of glass, the movable section C is raised from the plane of the deck or floor B. This is carried out by swinging the locking bars 69 in each bracket 33, to their uppermost positions by handles 70. The handles 62 are then employed to swing the legs 29 upwardly and downwardly, until the upturned ends 65 of plates 63 at the lower ends of channels 30, engage the deflector plates 66 and are passed therebeneath. The bars 69 are now returned to their lowermost positions in which they may not actively engage the plates 63 but will operate to prevent the ends 65 from "backing" away from beneath deflector plates which act might allow collapse of the section from its angular, erected form. The braces 64, formed by the folding members 71 and 72, also operate to spread the adjacent lower ends of the legs 29 and maintain them in angular position.

As shown in Figs. 2 and 8, the deck or floor B of the transfer buck is thus provided with a longitudinally and centrally disposed wall having convergently angled surfaces against which flat sheets may be loaded. Due to the actual size of the buck and the area of the floor outwardly from the wall or section C to either side edge it has been found possible to load glass sheets having an accumulative weight of up to at least two tons in weight on each side of the section C. When so loaded, by means of a crane or hoist truck, the buck can be lifted and placed upon another as shown in Fig. 12. A third buck can be as safely superimposed on the second and, in fact, additional bucks have been further added when the stacked arrangement is intended for storage purposes. The transfer bucks are arranged in stacked relation by means of the feet 59 of standards 16 which nest in the complementary cups 61 on the upper ends of posts 51.

When the section C is to be returned to its inoperative position, the bars 69 are swung upwardly and the braces 64 are lifted on their pivotal centers at rivets 73. The ends 65 of plates 63 may then be withdrawn from beneath the deflector plates 66 to allow the legs 29 of the section to be swung upwardly and then downwardly about the axes of pins 34. With the pairs of channels 30 and 31 again folded together about the axes of hinges 32, the felt strips 36 on channels 31 will rest on the bars 21 and so that the upper surfaces of the felt strips 36 on channels 30 will be located in the common plane of felt strips 26 as shown in Fig. 6.

In the event that the buck is intended to carry shaped or curved sheets, the movable section D is raised to its erected position, at which time the section C is located as shown in Fig. 1 and after it has been lowered from the position of Fig. 2. The frame 43 is then raised about the axes of pins 46, as shown in Fig. 10 and as the links 80 and 81 swing elbow-wise about the rivets 82. Preferably the slides 86 are moved to clear the chamfered ends 87 of links 80 and are then passed downwardly over said ends to maintain the links in alignment and consequently the section D, or frame 43, in its upright position. The padded surface or floor B will now be provided by the combined felt covering afforded by strips 26 and 36 so

that curved sheets S' can be properly loaded thereon against the felt covering 50 of the said section.

To lower this particular section of the transfer buck, the slides 86 are moved along the links 81 and from the ends 87 of link 80 thereby permitting the pairs of links to be folded and the frame 43 to be returned to the position shown in Fig. 7. To support the covering 50 in the common plane of the floor B, a wood strip or bar 92 may be secured to the rear surface of the web 45 of the frame.

When the transfer buck is unloaded and with others is to be transported while empty, it has been found expeditious to lower the end-frames E, thereby reducing the clearance or total height of the buck. This is accomplished by lifting the tubular bars 56 by handles 57 until their lower ends clear the joint of the hinges 52. As shown in Fig. 11, the posts 51 or the frame E can then be swung outwardly and downwardly until positioned as shown in phantom line therein. Referring now to Fig. 5, it will be seen that when the end-frames are so located, the cross bar 53 thereof will be disposed above the lower surfaces of channels 18 so as not to be struck or interfere with the platform or prongs of a hoist truck when the same are moved beneath the buck to lift it. Also in the position shown, the bars 53 do not obstruct entry of crane hooks into the holes 90 provided in the channels 18 for lifting the buck by crane.

When stacking a number of transfer bucks, and as also shown in Figs. 5 and 13, the second buck is lifted and then lowered until the feet 59 thereof can be directed downwardly into the open upper ends of the tubular standards 16 of the first or lower buck.

It is to be understood that the form of the invention herewith shown and described is to be taken as a preferred embodiment of the same, but that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

We claim:

1. In a transfer device for sheet materials, a substantially rectangular frame, a floor carried by the frame and formed by structural members arranged in spaced parallel relation both transversely and longitudinally within said frame, the structural members having padded upper surfaces disposed in a common substantially horizontal plane, the floor having stationary and movable sections, brackets affixed to alternate longitudinally arranged structural members, a section of the floor being formed substantially U-shaped and pivotally mounted by the legs thereof in said brackets, said section being movable from a horizontal position, in which it is disposed in a common substantially horizontal plane with the stationary floor sections, to a substantially vertical position for supporting thereagainst sheets disposed on edge on the stationary floor sections, a pair of hingedly connected links, one link of each pair being pivotally mounted on said movable section, the second link of each pair being pivotally mounted on the frame, and means for releasably securing each pair of links in alignment to maintain the movable section in substantial vertical position.

2. In a transfer device for sheet materials, a substantially rectangular frame, a floor carried by the frame and formed by structural members arranged in spaced parallel relation both transversely and longitudinally within said frame and in a common substantially horizontal plane, the floor having stationary and movable sections, brackets affixed to alternate longitudinally arranged structural members, a section of the floor being formed substantially U-shaped and pivotally mounted by the legs thereof in said brackets, said section being movable from a horizontal position, in which it is disposed in a common substantially horizontal plane with the stationary floor sections to form a substantially vertically positioned wall for supporting thereagainst curved sheets disposed on edge on the stationary floor section, a pair of hingedly connected links adapted to open and close elbow-wise, one

link of each pair being pivotally mounted on said movable section, the second link of each pair being pivotally mounted on the frame, and means for releasably securing each pair of links in alignment to maintain the movable section in substantial vertical position.

3. In a transfer device for sheet materials, a substantially rectangular frame, hollow standards arranged at the corners of the frame for supporting the same, each standard having a tapered foot, a floor carried by the frame and composed of stationary sections and movable sections, brackets affixed to alternate longitudinally arranged structural members, a section of the floor being formed substantially U-shaped and pivotally mounted by the legs mounted in said brackets, said section being movable from a horizontal position, in which it is disposed in a substantially horizontal plane with the stationary sections, to a substantially vertical position for supporting thereagainst sheets disposed on edge on the stationary sections, an end-frame pivotally mounted on the opposite ends of the frame and formed by hollow posts and an integral cross-member, each end-frame being movable from a substantially vertical position parallel to the said standards to a vertically aligned position therewith, and locking means maintaining the end-frames in said position of vertical alignment with the said standards.

4. In a transfer device for sheet materials, a substantially rectangular frame, hollow standards arranged at the corners of the frame for supporting the same, each standard having a tapered foot, a floor carried by the frame and composed of stationary sections and movable sections, brackets affixed to alternate longitudinally arranged structural members, a section of the floor being formed substantially U-shaped and pivotally mounted by the legs mounted in said brackets, said section being movable from a horizontal position, in which it is disposed in a substantially horizontal plane with the stationary sections, to a substantially vertical position in which it supports thereagainst sheets disposed on edge on the stationary sections, an end-frame pivotally mounted on each of the opposite ends of the frame and formed by hollow posts and an integral cross-member, each end-frame being movable from a substantially vertical position parallel to the said standards to a vertically aligned position therewith, a bar slidably movable within each hollow post of the end-frames, pin means supporting the bar midway of its length substantially equally in each of the hollow standards and in the hollow posts to maintain each end-frame in said position of vertical alignment, said means being operable to move the bar outwardly of the associated standard and bodily into the associated post to move the said end-frames from said position of vertical alignment with said standards.

5. In a transfer device for sheet materials, a substantially rectangular frame, hollow standards arranged at the corners of the frame for supporting the same, a floor carried by the frame and formed by structural members arranged in spaced parallel relation both transversely and longitudinally within said frame, the floor having stationary and movable sections, brackets affixed to alternate longitudinally arranged structural members, a section of the floor being formed substantially U-shaped and pivotally mounted by the legs mounted in said brackets, said sections being movable from a horizontal position in which it is disposed in a common substantially horizontal plane with the stationary sections, to a substantially vertical position for supporting thereagainst sheets disposed on edge upon the stationary sections, separate means for releasably securing each of said movable sections in substantially vertical position, an end-frame pivotally mounted on each of the opposite ends of the frame and formed by vertically disposed hollow posts and an integral cross-member, each end-frame being movable from a lower substantially vertical position parallel with the said hollow standards to an upper position of vertical alignment therewith, locking means releasably

securing each end-frame in said position of vertical alignment with said standards, and means at the lower end of each hollow standard receivable in the exposed upper ends of the hollow standards of another transfer device to vertically stack the first transfer device thereupon when said end-frames are disposed in the said lower substantially vertical parallel position.

6. In a transfer device for sheet materials, a substantially rectangular frame, hollow standards arranged at the corners of the frame for supporting the same, a floor carried by the frame and formed by structural members arranged in spaced parallel relation both transversely and longitudinally within said frame, the floor having stationary and movable sections, brackets affixed to alternate longitudinally arranged structural members, a section of the floor being formed substantially U-shaped and pivotally mounted by the legs mounted in said brackets, said section being movable from a horizontal position, in which it is disposed in a common substantially horizontal plane with the stationary sections, to a substantially vertical position in which it supports thereagainst sheets disposed on edge upon the stationary sections, separate means for releasably securing each of said movable sections in substantially vertical position, an end-frame pivotally mounted on each of the opposite ends of the frame and formed by vertically disposed hollow posts and an integral cross-member, each end-frame being movable from a lower substantially vertical position parallel with the said standards to an upper position of vertical alignment therewith, locking means releasably securing the posts of each end-frame in said position of vertical alignment with an associated standard, each hollow standard having a tapered foot, and means on each hollow post of said end-frames when in the upper position of vertical alignment for receiving the tapered foot of the standard of a second transfer device to support said second transfer device in rigidly stacked relation.

7. In a transfer device for sheet materials a substantially rectangular frame, a floor carried by the frame and composed of stationary sections and two types of movable sections, both types of said movable sections being movable from a horizontal position to a substantially vertical position in which they support thereagainst sheets disposed on edge upon the stationary sections, and means for maintaining the movable sections in substantially vertical position, one type of said movable sections comprising substantially vertical surfaces for supporting thereagainst substantially planar sheets disposed on edge on said floor and the other type comprising a vertically positioned wall and supporting thereagainst curved sheets disposed on edge on said floor.

8. In a transfer device for sheet materials a substantially rectangular frame, a floor carried by the frame and composed of stationary sections and two types of movable sections, each of the stationary and movable sections having padded upper surfaces for supporting the edges of sheets thereon, both types of said movable sections being movable from a horizontal position to a substantially vertical position in which they support thereagainst sheets disposed on edge upon the stationary sections, and means for maintaining the movable sections in substantially vertical position, one type of said movable sections comprising substantially vertical surfaces for supporting thereagainst substantially planar sheets disposed on edge on said floor and the other type comprising a vertically positioned wall and supporting thereagainst curved sheets disposed on edge on said floor.

9. In a transfer device for sheet materials a substantially rectangular frame, hollow standards arranged at the corners of the frame for supporting the same, each standard having a tapered foot, a floor carried by the frame and composed of stationary sections and two types of movable sections, both types of said movable sections being movable from a horizontal position to a substantially vertical position in which they support

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thereagainst sheets disposed on edge upon the stationary sections, and means for maintaining the movable sections in substantially vertical position, one type of said movable sections comprising substantially vertical surfaces for supporting thereagainst substantially planar sheets disposed on edge on said floor and the other type comprising a vertically positioned wall and supporting thereagainst curved sheets disposed on edge on said floor.

10. In a transfer device for sheet materials, a substantially rectangular frame, a floor carried by the frame and formed of structural members arranged in spaced parallel relation both transversely and longitudinally within said frame and in a common substantially horizontal plane, said floor including both stationary and a plurality of movable sections, and said movable sections being movable from the horizontal plane to a substantially vertical position and supporting thereagainst sheets disposed on edge on the stationary remainder of the floor, and releasable securing means associated with each movable section for releasably securing the movable section in a substantially vertical position, one of said movable sections having a pair of units for supporting sheets thereagainst and pivotal connecting means for fastening said pair of units together whereby each unit lends support to the other.

11. In a transfer device for sheet materials, a substantially rectangular frame, a floor carried by the frame and formed of structural members arranged in spaced parallel relation both transversely and longitudinally within said frame, the structural members having padded upper surfaces disposed in a common substantially horizontal plane, the floor having stationary and a plurality of movable sections, one of said movable sections of the floor carried on transversely located structural members and being formed by two groups of related movable channels and outwardly directed padded surfaces, hinge means for pivotally fastening the two groups of channels together, pivotal fastening means for mounting the first of said groups of channels on the related structural member, cross members interconnecting the channels of each group of channels to move the same in unison from a horizontal position to a substantially vertical position, releasable securing means for releasably securing the second of the groups of channels from movement when in a substantially vertical position, and bracing members for retaining the two groups of channels in convergently angular relation with respect to one another and supporting thereagainst sheets disposed on edge on the stationary sections of the floor.

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12. In a transfer device for sheet materials, a substantially rectangular frame, a floor carried by the frame and formed by structural members arranged in spaced parallel relation both transversely and longitudinally within said frame, and in a common substantially horizontal plane, the floor having stationary and a plurality of movable sections, one of said movable sections of the floor carried on alternate transversely arranged structural members and being formed by two groups of related channels, cross members interconnecting the channels of each group to move the same in unison from a horizontal position, hinge means for pivotally fastening the two groups of related channels together, brackets affixed to said alternate, transversely arranged structural members, a pin carried at one end of each of the brackets for pivotally supporting the channels of one group of channels, said sections being movable from a horizontal position to a substantially vertical position, releasable securing means for securing the other of the groups of channels from movement when in substantially vertical position, and releasable bracing members for maintaining the two groups of channels in a convergently angular relation with respect to one another for supporting thereagainst sheets disposed on edge on the stationary sections of the floor.

13. In a transfer device for sheet materials, a substantially rectangular frame, a floor carried by the frame and formed by structural members arranged in spaced parallel relation both transversely and longitudinally within said frame, the floor having stationary and movable sections, brackets affixed to alternate longitudinally arranged structural members, a section in the floor being formed substantially U-shaped and pivotally mounted by the legs thereof in said brackets, said sections being movable from a horizontal position to a substantially vertical position and supporting thereagainst sheets disposed on edge on the stationary floor sections, and means for maintaining the movable section in a substantially vertical position.

References Cited in the file of this patent

UNITED STATES PATENTS

1,712,342	Fitzgerald	May 7, 1929
1,836,362	Crowley	Dec. 15, 1931
2,471,693	Lilienfeld	May 31, 1949
2,497,453	Hazen	Feb. 14, 1950
2,579,655	Donald	Dec. 25, 1951
2,654,487	Degener	Oct. 6, 1953