April 15, 1952 E. L. CROSTON 2,593,012

PRESS LOADING MECHANISM

Filed May 14, 1949 2 SHEETS--SHEET 1

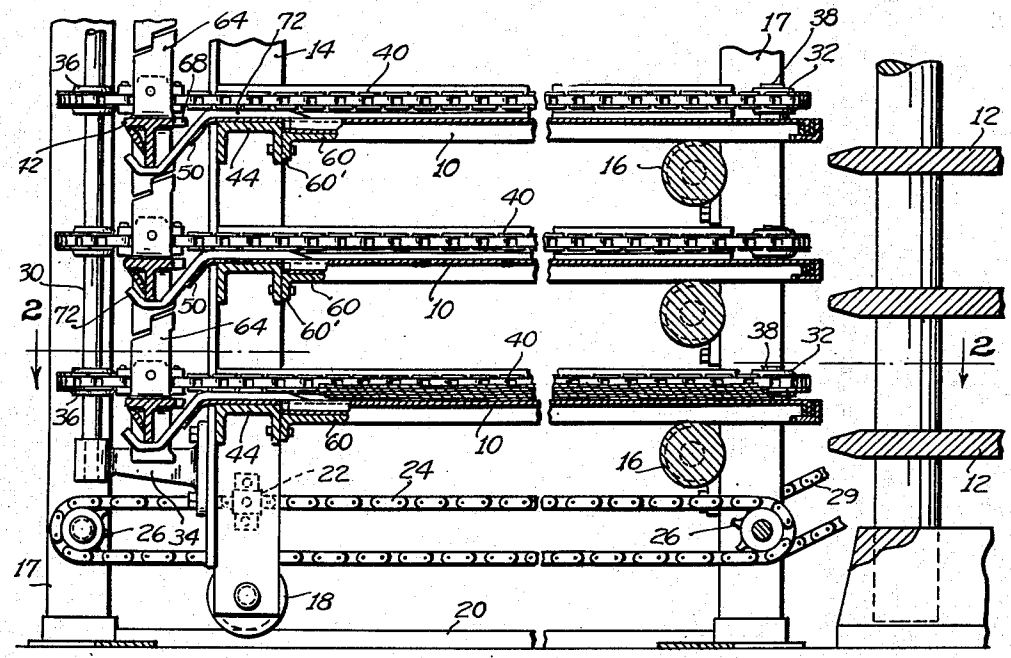

Fig. 1.

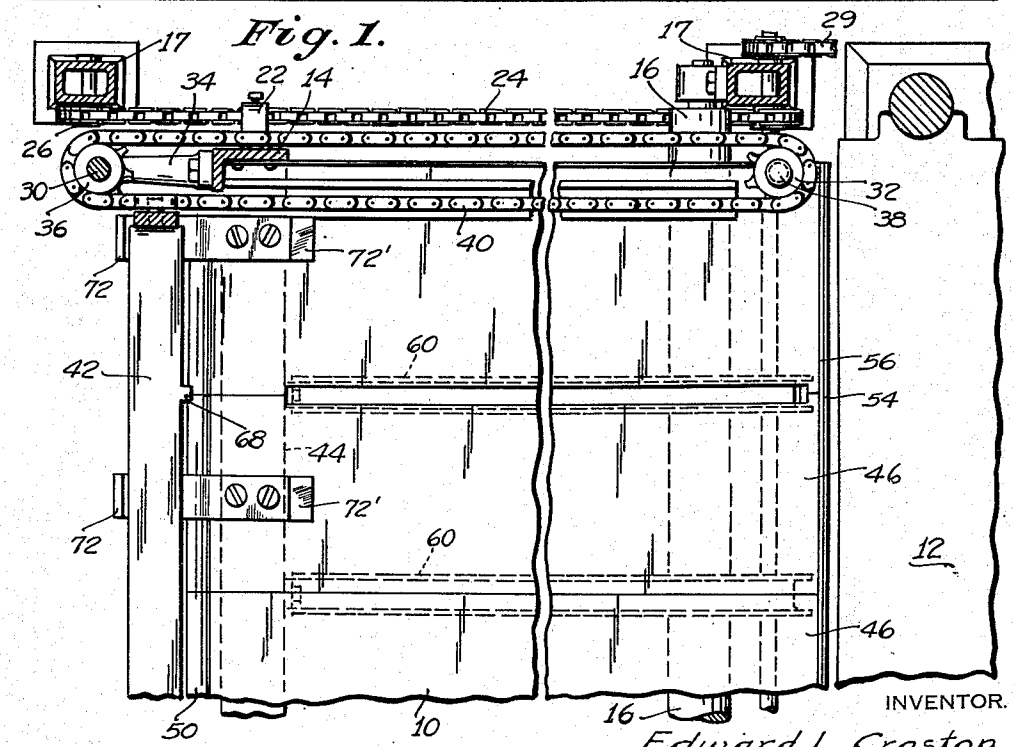

Fig. 2.

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Filed May 14, 1949 2 SHEETS—SHEET 2

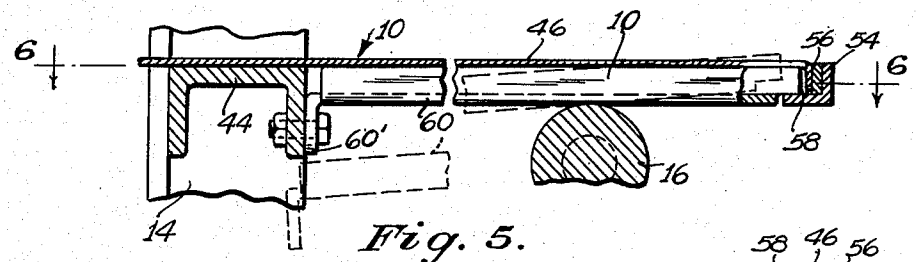

Fig. 5.

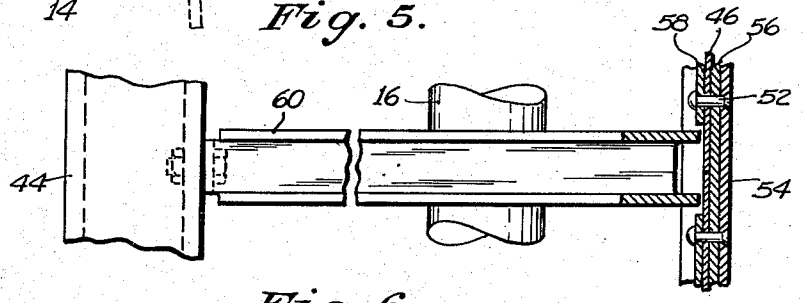

Fig. 6.

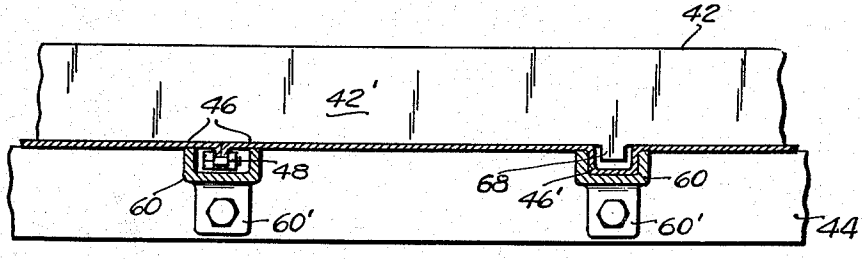

Fig. 4.

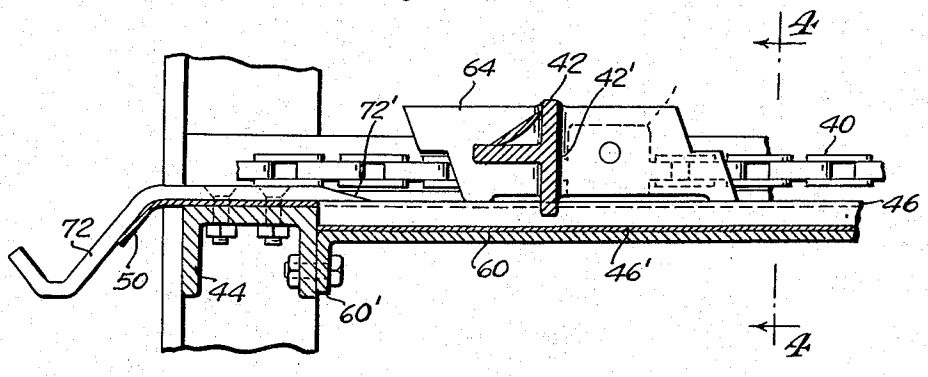

Fig. 3.

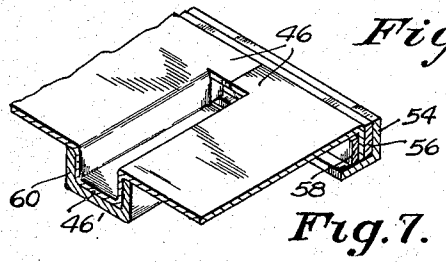

Fig. 7.

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PRESS LOADING MECHANISM

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Application May 14, 1949, Serial No. 93,253

8 Claims. (Cl. 214—1)

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This invention relates to sheet loading mechanisms and is primarily concerned with improvements in the type of device disclosed generally in the patent to Skoog, No. 2,376,457, May 22, 1945. As herein described, the improved loading device is adapted to be used in connection with a multiplaten press, such as for pressing veneer in the manufacture of plywood, but is applicable for loading different types of equipment for other operations, such as drying.

The loading device described has one or more sheet supporting trays vertically spaced and movably mounted appropriately for entrance, each carrying a sheet or group of sheets, into the spaces between the successive press platens, the latter being arranged one spaced above the other when the press is opened. The stacked sheets, carried into the press by forward movement of the respective trays, are deposited on the underlying platens by reverse movement of the trays. In their reverse movement, the trays are withdrawn from beneath the several sheets until the latter are supported at full length on the press platens. Transfer of the sheets to the platens in this manner during return movement of the trays is effected by hold-back or pusher bars which engage the sheets to prevent the trays dragging them back by friction. The trays, pusher bars and their respective operating mechanisms constitute elements of the general loading mechanism in its withdrawn entirety from the press before subsequent press operation. Moreover, valuable operating time is saved by charging the loader while the press is closed, such that when the press again opens the panels pressed therein are ejected by the advancing trays, and the next charge of sheets is simultaneously inserted.

Heretofore, certain parts of such loading devices, subject to wear, have been difficult to replace. Parts which failed because of undetected wear have caused considerable damage to the press. Parts which were found to be defective during operation interrupted use of the press during repair operations. In addition, sheets sometimes escaped under the pusher bar and were dragged back with the trays, delaying operation or damaging work.

This invention involves an improved tray structure which enables replacement of parts most subject to wear economically and so rapidly that exchange of parts may be accomplished usually without disrupting appreciably the normal operation of the loading mechanism and press. Further objects are to devise such an improved tray structure designed for durability

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and minimum wear of the press platens on which the trays move, and wherein the tray structure parts subjected to wear are comparatively inexpensive, easily accessible for replacement and individually replaceable by operations which are few and simple.

The present improvements pertain also to the effectiveness of the pusher bar mechanism and cooperate with the improved tray structure. In particular, the bars are specially formed with tabs traveling in tray channels to prevent sheets escaping beneath the bars during withdrawal of the trays from the press.

The over-all considerations of low initial cost, simplicity, reliability and ruggedness of construction, as well as operational accuracy in positioning sheets in the press have entered in large measure into the improvements herein disclosed.

The particular objects and advantages of the invention may be further appreciated and its various features and details best understood by reference to the accompanying drawings upon which the following detailed description is based.

Figure 1 is a longitudinal vertical sectional view of my improved loading mechanism as applied to the loading of a multiplaten press, portions of the press and loading mechanism being broken away for ease of illustration.

Figure 2 is a fragmentary view of the loading mechanism and press, taken on the section line 2—2 of Figure 1.

Figure 3 is a sectional detail view of the receiving end of one of the loading units, showing a portion of the loading tray and the associated presser bar mechanism.

Figure 4 is a transverse vertical sectional view of a fragment of the tray structure, taken on line 4—4 of Figure 3.

Figure 5 is a longitudinal vertical sectional view of a loading tray illustrating by broken lines the manner of removing the tray-plate-supporting longitudinal brass channel shoes for replacement of shoes, and Figure 6 is a horizontal sectional view taken on line 6—6 of Figure 5.

Figure 7 is a fragmentary top perspective view of a tray showing a channeled portion.

Reference is made to the Skoog patent mentioned above for general aspects of operation of the loading mechanism. The illustrated mechanism includes loading trays 10 registering with press platens 12 and supported in cantilever fashion by vertical angle-iron supporting legs 14 at the loading ends of the trays. Remote from the supports 14 the discharge ends of the trays

are further supported alternately by rollers 16 and the press platens 12, the roller tops being level with or slightly above the principal portion of the platen surfaces on which the trays slide when entering the press. Edgewise reciprocation of the trays parallel to the press platens is effected by a pair of drive chains 24 connected by a fitting 22 to the respective tray legs 14 on the lower ends of which are mounted wheels 18 rolling on tracks 20. These chains pass around pinions 26 on the vertical frame members 17 at the corners of the mechanism and are driven by a third chain 29 from suitable power means (not shown). Operation of this tray carriage mechanism may be made automatic, if desired, coordinated with opening of the press.

Similarly, the coacting pusher bars 42 are shifted by pairs of chains 40, one pair connected to the opposite ends of each bar, extending along the tray opposite side edges, and passing over sprockets 32 on stub shafts 38 mounted on the discharge end corners of the trays and sprockets 36 on parallel drive shafts 30 carried by brackets 34 secured to legs 14 at the opposite or receiving end of the loader. Interlocking runners or links 64 pivotally connected to the chains are secured upon and carry the opposite ends of the pusher bars for reciprocation of the bars toward and away from the press. The chains 40 move bodily with the trays into and out of the press, with the chain drive shafts 30 idle during movement of the trays into the press, driven in one direction to hold the pusher bars stationary during retraction of the trays from the press, and then reversed in motion to withdraw the pusher bars to their initial position of rest at the receiving edges of the trays at the end of tray-return movement. The pusher bars 42 have surfaces 42' swingable between horizontal position flush with the tray tops (Figure 1), assumed during loading of the loader trays, and vertical, sheet engaging position (Figure 3), assumed during transfer of the sheets from the loader to the press, generally similar to the operation of the earlier machine.

The present invention resides in certain improvements in construction of the trays 10 and of the coacting pusher bar mechanism. Such trays are of sectional construction, including tray plate sections 46 having their adjoining side or longitudinal edges flanged downward and secured together by bolts 48 to form an unbroken sheet-supporting tray surface (Figure 4). When worn or damaged the individual tray plate sections can be replaced readily rather than replacing the entire tray, and the cost of replacement is small.

The movable supporting posts 14 are interconnected by structural tray-supporting channels 44 with down-turned flanges (Figures 1 and 3). The receiving ends of the tray plate sections rest upon these channels and the sections project from them toward the press. These ends of the tray plates are turned down to form a continuous reinforcing edge 50 (Figures 1 and 3). The ends of the plate sections 46 adjacent to the press are flanged downward and secured by bolts or rivets 52 to the angle brass stiffener and shoe member 54 extending the width of the tray, as shown in Figure 5. The rivets pass through the vertical flange of the shoe angle 54, the tray plate flange, a reinforcing spacer strip 56 interposed between the tray plate flange and shoe flange and reinforcing or washer strips 58 backing the tray flange.

The tray supporting structure is completed by longitudinal channel brass shoes 60 located at intervals widthwise of the tray and extending longitudinally between members 54 and 44 to support the tray plate sections. Since these shoes ride on the press platens as the trays are slid into the press, it will be evident that the shoe metal should be a low friction bearing metal complemental to the press platens, and with steel platens brass shoes are preferred. These channels at their ends beneath the loading ends of the trays and remote from the press are cut and their webs bent down to form mounting flanges 60' bolted to the adjoining flanges of the structural channel 44 as shown in Figures 3, 4 and 5. To support the channels 60 at their opposite ends, they are notched for insertion into the space between the inwardly directed horizontal flange of the angle brass stiffener 54 and the tray plate bottom, at the same time providing a flush relationship between the channel and angle brass shoes for uniform sliding contact thereof with the respective press platens.

In addition to acting as shoes on which to support the trays in the press the channels 60 serve other purposes, one of which is to receive and house the longitudinal tray plate flange joints. The upturned flanges of these channels supportingly engage the bottoms of the plate sections at opposite sides of these joints. Other similar brass channel shoes 60 support the tray plates at intermediate locations at which, complemental to these intermediate channels, the tray plates are creased or bent to form longitudinal grooves or channels 46' entering the openings of channels 60 and extending the length thereof, for stiffening and supporting purposes. Near their edges remote from the press, at the locations of the formed channels 46', the tray plates are slotted at the ends of such channels to permit these channels to be formed without buckling of the plate area which directly overlies the structural channel 44 and which must remain substantially flat.

If the brass channel shoes 60 become worn from sliding on the press platens or rolling on rollers 16, they are easily replaced. An individual channel shoe is removed by removing its supporting bolt from its flange 60' and the structural channel 44 and swinging that end of the shoe down until it clears the lower edge of such channel, when the channel shoe 60 may be drawn lengthwise away from the press to remove it from its support on the stiffener shoe 54. As the end of the channel shoe remote from roller 16 is swung downward the shoe pivots on such roller as a fulcrum (Figure 5), temporarily deflecting upward that portion of the tray above the roller the necessary amount to permit withdrawal of the channel shoe. A new channel shoe may be inserted by the reverse procedure. It should be noted that the formed channels 46' and tray plate flange joints 48 serve as locating guides to facilitate reinstalling channels 60 by sliding them lengthwise along the channels and joints in straddling relationship. A particular advantage of this feature resides in the convenience and rapidity with which worn channel shoes may be replaced while the press is in operation and without dismantling the loading mechanism. While angle member 54 will be worn during the initial use of the loader it is not necessary to replace it, because the shoes 60 will afford adequate support for the tray. When these are renewed member 54 will not contact the press platens until shoes 60

again are worn sufficiently to require replacing. Consequently member 54 will suffer no appreciable additional wear.

To increase the load-carrying ability of the shoes, it is preferred that they be bowed upward slightly prior to assembly with a tray. Upon assembly the central portion will then be stressed and pressed tightly against the bottom of the tray and the end adjacent to the press will fit tightly in the angle member 54.

Tabs 68 on the lower edges of the bars 42, which enter the formed channels 46' in the tray plates with the pusher bar in operative position for reciprocation to engage the edges of panels to be delivered to the press, insure that the veneer sheets held in the press by the bars cannot pass beneath them as the trays are retracted. More dependable operation of the loading mechanism is thereby obtained.

The T-bars 42 are supported between the pendulous runners 64 which swing through right angles as the bars are returned from operative position to retracted position ready for refilling of the loader. In such retracted position the hold-back bars drop into hook-like hangers 72 projecting from the receiving edge of each tray at locations spaced inward from legs 14. These project beyond the tray and extend slightly below the tray proper to bring the T-bar upper surface level with the tray. For mounting purposes these hangers include shank portions secured to the top of the structural channel 44. The inner ends of these straight portions are beveled to form cam surfaces or guides 72' inclined upward from the plate of the tray surface. Upon reaching these cam surfaces during its return movement a pusher bar is raised sufficiently so that its tabs clear the plate-covered structural channel 44 during passage over it.

I claim as my invention:

1. In tray type loading mechanism for transferring sheets to receiving surfaces, a tray reciprocable edgewise between a withdrawn position adjacent to a receiving surface and transfer position overlapping such surface, said tray comprising a row of generally coplanar, aligned sheet sections, successive sections having downwardly flanged adjacent side edges secured together, and aligned end edges disposed perpendicular to said flanged edges at the tray's end adjacent to such receiving surface, a stiffener shoe member extending along and interconnecting said aligned end edges for stiffening of such end edges and projecting below such end edges for sliding engagement of such shoe with such receiving surface as the tray moves into overlapping relationship therewith, and a plurality of channel tray-supporting shoe members each receiving between its flanges one of said section flange connections and projecting beneath such sections to slidably engage such receiving surface cooperatively with said stiffener shoe member, said channel shoe members extending perpendicular to said stiffener shoe member and having one end supported thereby.

2. In tray type loading mechanism for transferring sheets to receiving surfaces, a tray reciprocable between a withdrawn position adjacent to a receiving surface and transfer position overlapping such surface, said tray comprising a row of generally coplanar, aligned sheet sections, successive sections having downwardly flanged adjacent side edges secured together, each such section being formed with downwardly projecting channels between and parallel to said

flanged edges and having aligned end edges disposed perpendicular to said flanged edges at the tray's end adjacent to such receiving surfaces, a stiffener shoe member extending along and interconnecting said aligned end edges for stiffening of such end edges and projecting below such end edges for sliding engagement with such receiving surface as the tray moves into overlapping relationship therewith, a plurality of channel tray-supporting shoe members each receiving between its flanges one of said section flange connections and said channeled section portions and projecting beneath such sections to slidably engage such receiving surface cooperatively with said stiffener shoe member, said channel shoe members extending perpendicular to said stiffener shoe member and having one end removably supported thereby, and means disengageably interconnecting the other ends of said channel tray-supporting shoe members for quick disengagement of such members therefrom.

3. In tray type loading mechanism for transferring sheets to receiving surfaces, a tray reciprocable between a withdrawn position adjacent to a receiving surface and transfer position overlapping such surface, said tray comprising a row of generally coplanar, aligned sheet sections, successive sections having downwardly flanged adjacent side edges secured together, each such section being formed with downwardly projecting channels between and parallel to said flanged edges and having aligned end edges disposed perpendicular to said flanged edges at the tray's end adjacent to such receiving surfaces, a stiffener shoe member extending along and interconnecting said aligned end edges for stiffening of such end edges and projecting below such end edges for sliding engagement with such receiving surface as the tray moves into overlapping relationship therewith, a plurality of channel tray-supporting shoe members each receiving between its flanges one of said section flange connections and said channeled section portions and projecting beneath such sections to slidably engage such receiving surface cooperatively with said stiffener shoe member, said channel shoe members extending perpendicular to said stiffener shoe member and having one end supported thereby, and a pusher bar extending transversely of said formed channels, movable relative to said sheet tray sections parallel to such channels and having tabs projecting downward below the lower edge thereof into said formed channels, operable to block movement of sheets edgewise between said pusher bar and said tray sections.

4. In tray type loading mechanism for transferring sheets to receiving surfaces, a linearly reciprocable sheet metal tray formed with downwardly projecting channel portions at a plurality of spaced locations, defining tray surface grooves each parallel to the direction of tray reciprocation, stiffener shoe means extending along one end of said tray perpendicular to said grooves and having a horizontal flange projecting inwardly toward the opposite end of said tray and slidably engageable with the receiving surface, and a plurality of channel tray-supporting shoes each releasably connected by one end to the end of the tray opposite said stiffener shoe and each receiving between its flanges one of such downwardly projecting channel portions, each of said channel shoes having its opposite end slidably supported on said horizontal flange for endwise withdrawal therefrom when released at its opposite end, while being normally restrained by said

channel portions against lateral sliding on said horizontal flange.

5. In tray type loading mechanism for transferring sheets to receiving surfaces, a supporting bar, a sheet metal tray having one end overlying and secured to the upper side of said supporting bar, reciprocable transversely thereof and formed with downwardly projecting channel portions at a plurality of spaced locations, defining tray surface grooves each perpendicular to said supporting bar and at one side thereof, a stiffener member extending along the opposite end of said tray, a plurality of channel tray-supporting shoes each at one end supportingly engaged by said stiffener member and each receiving between its flanges one of such downwardly projecting channel portions and normally arched upward, and means interconnecting the opposite end of each shoe and said supporting bar and holding such shoe stressed in substantially straight condition pressed against the under side of said tray.

6. In tray type loading mechanism for transferring sheets to receiving surfaces, a linearly reciprocable sheet metal tray having downwardly bent portions at a plurality of spaced locations, forming downwardly projecting ridges extending parallel to the direction of tray reciprocation, a stiffener member extending along and connected to an edge of said tray perpendicular to said ridges, and a plurality of channel tray-supporting shoes slidable on the receiving surface and each receiving between its flanges one of such ridges, and having one end removably supported by said stiffener member and its opposite end removably connected to the opposite end of the tray.

7. In tray type loading mechanism for transferring sheets to receiving surfaces, a sheet metal tray reciprocable linearly between a withdrawn position adjacent to a receiving surface and transfer position overlapping such surface, said tray having downwardly bent portions at a plurality of spaced locations, forming downwardly projecting ridges arranged parallel to the direction of tray reciprocation, an angle stiffener shoe member extending along and connected to the edge of such tray adjacent to such receiving surfaces and perpendicular to said ridges and having a horizontal flange disposed below such edge for sliding on such a receiving surface as the tray moves into overlapping position relative to such surface, and a plurality of channel tray-supporting shoes each receiving between its flanges one of such ridges, extending perpendicular to said shoe stiffener member and having one end resting slidably on such horizontal flange thereof to dispose the bottom surface of said channel plate-supporting shoes substantially in the same plane as the bottom of said horizontal flange of said angle stiffener shoe member, and having its opposite end connected to the opposite end of the tray.

8. In tray type loading mechanism for transferring sheets to receiving surfaces, a sheet metal tray reciprocable linearly between a withdrawn position adjacent to a receiving surface and transfer position overlapping such surface, said tray having downwardly bent portions at a plurality of spaced locations, forming downwardly projecting ridges arranged parallel to the direction of tray reciprocation, an angle stiffener shoe member extending along and connected to the edge of said tray adjacent to such receiving surfaces and perpendicular to said ridges and having a horizontal flange disposed below such edge for sliding on such a receiving surface as the tray moves into overlapping position relative to such surface, a plurality of channel tray-supporting shoes each receiving between its flanges one of such ridges, extending perpendicular to said shoe stiffener member and having one end resting slidably on such horizontal flange thereof to dispose the bottom surface of said channel plate-supporting shoes substantially in the same plane as the bottom of said horizontal flange of said angle stiffener shoe member, and separate means supporting the other end of each of said tray-supporting shoes for quick disengagement and withdrawal of any tray-supporting shoe endwise off said shoe stiffener member horizontal flange in removing such shoe from beneath the tray.

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