Aug. 22, 1933. C. F. CODA 1,923,663

MACHINERY FOR HANDLING CHASSIS FRAMES

Filed Aug. 12, 1930 3 Sheets-Sheet 1

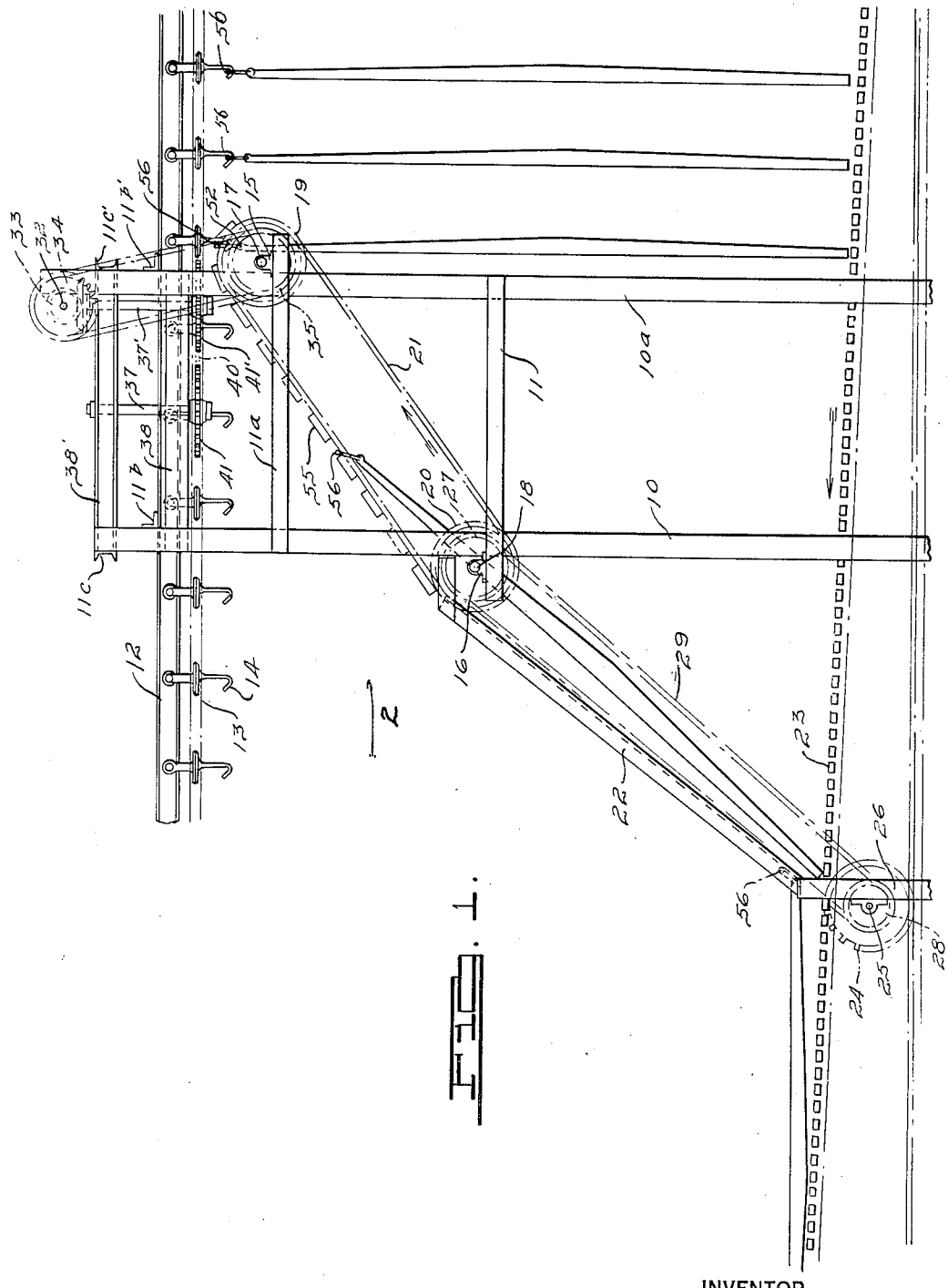


Fig. 1.

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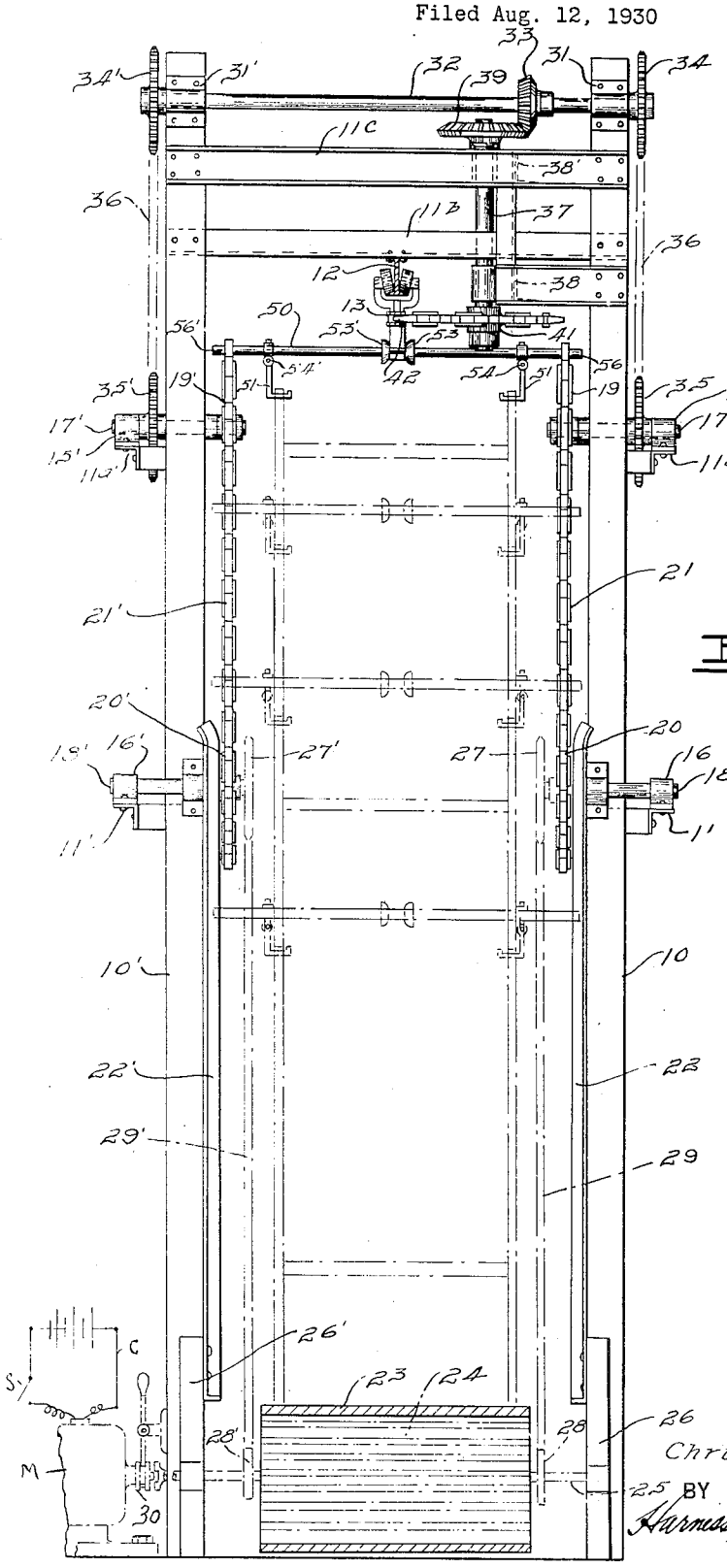


Fig. 2.

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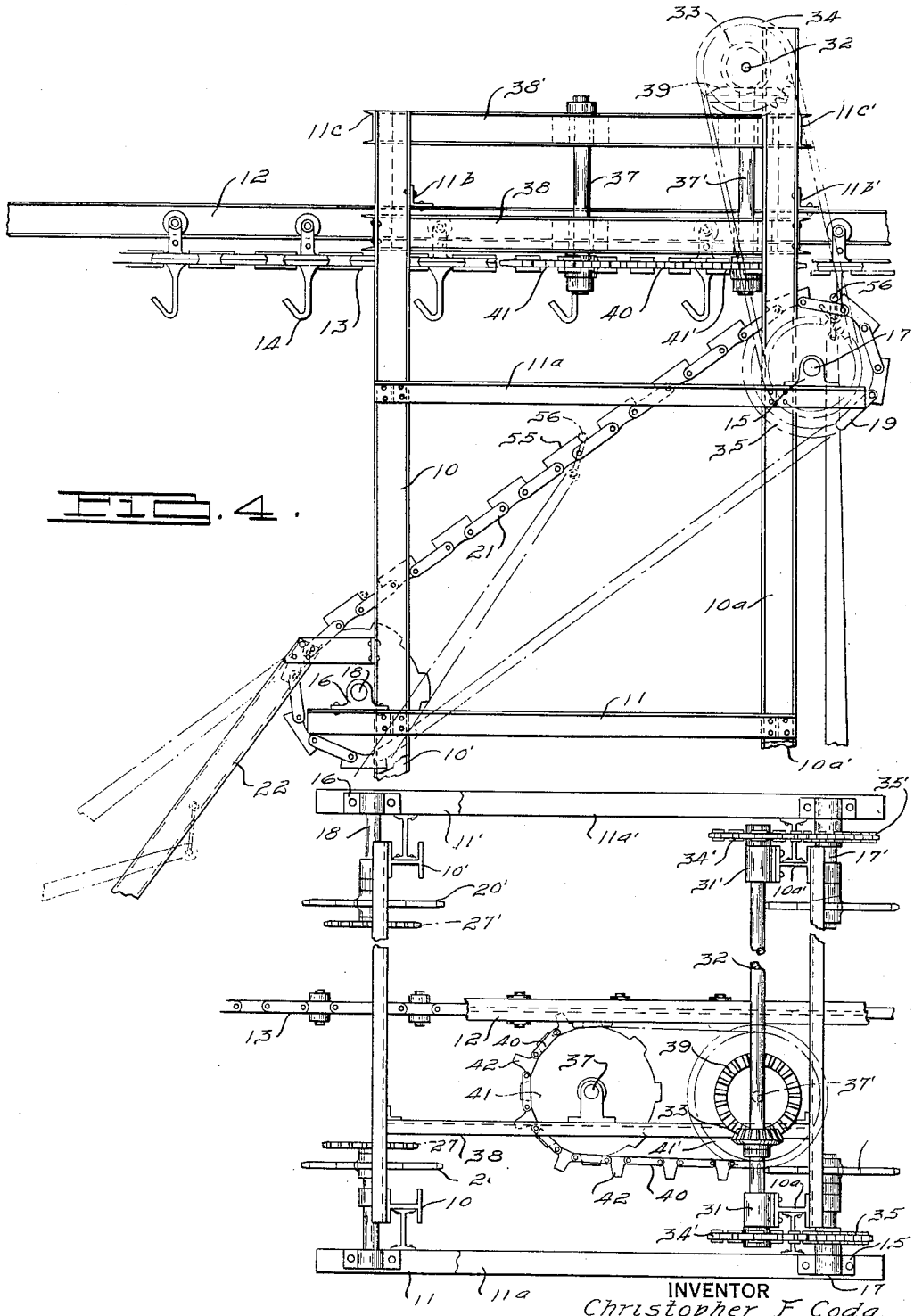


FIG. 4.

FIG. 3.

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UNITED STATES PATENT OFFICE

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MACHINERY FOR HANDLING CHASSIS FRAMES

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Application August 12, 1930. Serial No. 474,764

13 Claims. (Cl. 198—20)

As may be inferred from the above title, it is an object of this invention to provide means wholly or largely obviating reliance upon manual labor in the handling of heavy units such as the chassis frames of automotive vehicles.

It being customary to advance heavy frames of the general character referred to, from one operation to another or from a final operation to a point of delivery or storage, by means including an overhead or upper chain conveyor provided with hooks from which the frames freely depend, it is an object of the present invention to provide, for use therewith, mechanical means to receive and advance said frames as a horizontal series at a lower level; and preferred embodiments of the invention may include not only a lower traveling conveyor, preferably of belt type, but intermediate means for the transfer of successive frames from an upper conveyor to a lower conveyor of the type referred to.

Assuming the upper conveyor to be of so-called "endless" type, and to advance at a moderate rate such as 5 feet per minute, it is an object of this invention to provide a lower conveyor advancing at a sufficiently higher rate to permit the mentioned frames to be disposed upon the latter in an orderly arrangement, and preferably end to end; and the mentioned intermediate means may advantageously be driven from one or the other of said conveyors and at a rate intermediate between the rates thereof.

In the use of overhead conveyors for the purpose referred to, it has been customary to employ a ground crew of men, these being sometimes aided by an overhead crew, said crews cooperating in the lifting of the successive frames from their respective hooks. The ground crews have been required to grab said frames and, advancing the lower ends thereof more rapidly than their tops until said frames reach an inclined or horizontal position, to hasten away with each frame at such a rate as to permit the next frame to be similarly manipulated; but such labor is naturally fatiguing and not free from the dangers incidental to hurry and fatigue; and it is accordingly a general object of this invention to enable operations of the character referred to to be performed more economically, more expeditiously and more safetly than heretofore.

Another object of the present invention includes the provision of a preferred type of frame hanger, cooperating with both the mentioned upper conveyor and the mentioned intermediate transferring means,—the latter preferably including both a pair of laterally disposed and sprocket-driven chains, so spaced apart as to permit the lower ends of frames to advance therebetween, and also a pair of inclined guides extending upward into a position of cooperation with said chains and downward into a position of cooperation with the mentioned belt conveyor.

Other objects of the present invention, including features of drive mechanism and of support for relatively moving parts, may be best appreciated from the following description of an illustrative embodiment of the invention, taken in connection with the appended claims and the accompanying drawings.

Fig. 1 is a side elevational view, with parts broken away and with optional features included or diagrammatically suggested.

Fig. 2 is an elevational view, taken from the general direction suggested by the arrow 2 of Fig. 1.

Fig. 3 is a partial top plan view showing a power take-off from a conveyor chain, but with parts broken away and with chains of a transfer device omitted.

Fig. 4 is a side elevational view, enlarging a central portion of Fig. 1.

Referring first to general features of the illustrated embodiment of the present invention, upright frame elements 10, 10' and 10*a*, 10*a*', longitudinal horizontal frame elements 11, 11', 11*a*, 11*a*' and transverse frame elements 11*b*, 11*b*' and 11*c*, 11*c*' are shown as employed to support not only a rail 12 for an upper conveyor comprising a chain 13, carrying hooks 14, but also bearing brackets 15, 15' and 16, 16' for pairs of short shafts 17, 17' and 18, 18',—the latter carrying sprocket wheels 19, 19' and 20, 20' over which extend block-carrying chains 21, 21' adapted to advance successive chassis frames F, or the like, toward guide channels 22, 22', terminating above a belt conveyor 23.

Although the mentioned guides 22, 22' might be used in conjunction with any preferred means for lifting successive frames from the advancing hooks 14, shown as comparatively broad in a transverse direction; and although the chains 21 might be so extended as to bring the sprockets 20, 20' to any desired lower level relatively to the conveyor 23 (either of the mentioned devices of the illustrated transfer means being optionally eliminated) it will be obvious that the advance of the chains 21, 21', when employed, should not only be synchronized with reference to the advance of the chain 13, or its equivalent, but accelerated relatively thereto. Chains 21, 21' are disposed and equipped favorably to a frame-lifting effect; and, to accomplish this result, they may advantageously be driven directly or indirectly from one of the conveyors 13 or 23 and at a linear rate such as 10 to 15 feet per minute,— optional means for this purpose being hereinafter described.

The vertical distance between the upper conveyor 13 and the lower conveyor 23 is preferably such that no matter what means may be em-

ployed to release the successive frames from conveyor 13, the lower ends of said frames come into engagement with the conveyor 23 at about the time that the upper ends of said frames are removed from the hooks 14; and it should be understood that, regardless of the specific character of the intermediate transfer means employed, such transfer means should provide an unobstructed space therebelow and the relative rate of advance of the conveyor 23 should be such as to carry the lower end of each frame forward, by an amount at least equal to the length of said frame, during the descent of the upper end of the frame substantially to the level of the conveyor 23,—the linear rate of the latter being accordingly about 35 to 40 feet per minute in the case assumed.

Consistently with the foregoing, the showing of means such as a sprocket drum 24, carried by a shaft 25 extending between posts 26, 26' (optionally employed to support the lower ends of the guide channels 22, 22') and especially the suggestion of intermediate drive means including sprockets 27, 27' on shafts 18 and 18' and sprockets 28, 28' on shaft 25, chains 29, 29' being carried over the respective pairs of sprockets, should be understood as merely diagrammatic and as indicative of the mentioned synchronization of movement, although power for the driving of mentioned parts may be obtained from any suitable source or sources. For example, a motor M controlled by a switch S in a circuit C may be employed to drive the shaft 25,—the interposition of a clutch being diagrammatically suggested at 30 and reducing gear being omitted. But motion is preferably imparted to the respective chains 21, 21', by means imparting corresponding rotation either to the shafts 17, 17' or to the shafts 16, 16'; and such motion may advantageously be derived, as above suggested, indirectly and wholly or largely from the chain 13, or its equivalent.

In the preferred form, vertical frame elements 10*a*, 10*a*' extend upward above horizontal frame elements 11*c*, 11*c*' to a sufficient distance satisfactorily to support bearing brackets 31, 31' for a horizontal shaft 32 carrying both a bevel gear 33 and sprocket gears 34, 34',—the latter being disposed in the same vertical plane with similar sprocket gears 35, 35', on the respective shafts 17, 17' and adapted to impart motion thereto by means of socket chains 36, 36'. Vertical shafts 37, 37' may then be supported in any appropriate manner, as by means of brackets extending inwardly from additional frame elements 38, 38',—the latter being shown as terminally connected with mentioned horizontal frame elements 11*c*, 11*c*', and the shaft 37' being shown as terminally provided with a bevel gear 39 adapted to engage with the mentioned gear 33; and motion may be imparted thereto in a novel manner by means comprising a sprocket chain 40. This chain is shown as extending over sprockets 41 and 41' provided upon the lower ends of the shafts 37 and 37'. The links of this chain are shown as provided with outwardly projecting teeth or lugs 42, adapted to intermesh with links of the chain 13; and the shafts 37 and 37' may be unequally spaced from said chain, to facilitate an intermeshing of said teeth, for a driving effect upon chain 40.

Unless the upper ends of the frames F happen to include transverse elements and/or projections or elements suitable for engagement by the hooks 14 and projecting laterally to a sufficient extent to engage the chains 21, 21' and/or the guide channels 22, 22', use may be made of special hangers comprising rods 50. These are shown as provided with laterally movable hooks 51, 51' adapted to enter openings in the upper ends of the respective frames F, supporting the same in vertical arrangement, and as provided also with annular spacers or collars 53, 53',—between which the hooks 14 may be received in such manner as to centralize and orient the frames incidentally to the positioning of the same thereon; and although the hooks 51, 51' are shown as pivoted at 54, 54' for lateral movement, it will be obvious that the exact location and configuration of these hooks, as also the form and/or location of other parts mentioned, must depend upon the type of the frames F to be handled. Any separable hangers will naturally be returned to a loading station for repeated re-use.

The chains 21, 21' may be provided with any suitable means, (engaging laterally extending elements such as ends 56, 56' of hanger rods 50 and such as blocks 55) serving not only to lift the units successively from the hooks 14 but to carry the same forward and downward toward the guides 22, 22' and/or the belt conveyor 23; and it will be understood that the form and spacing of the blocks 55 and the chains 21, 21' are intended to accord with the illustrated mode of operation. The lower end of each frame F or like heavy unit is preferably engaged by the conveyor 23 at the beginning of the descent of said frame after it has been lifted from a hook 14; and said lower end is thereafter carried forward, preferably without appreciable drag relatively to the conveyor 23, at such a rate as to deliver successive frames in a substantially end-to-end arrangement upon said conveyor,—the end portions 56, 56' of rods 50 being received successively by chains 21, 21' and by guides 22, 22' when both of these transfer devices are employed.

The intended mode of operation of all features of the present invention having been indicated in connection with the foregoing description thereof it may be mentioned that the laterally spaced guides 22, 22' if used may advantageously be of either channel or angle section, the latter being shown, and disposed either in the same planes with the laterally spaced chains 21, 21' or in planes laterally offset therefrom,—the latter construction being practicable only in case the rods 50 extend to a slight extent beyond said chains, as shown; and it is again emphasized that chains 21, 21', when used, need not be driven both from above and from below.

It will, however, be understood not only that various features of the present invention might be independently employed but also that numerous modifications, additional to any suggested herein, might easily be devised by skilled workers, if informed of the foregoing,—all without departure from the scope of the present invention, as the latter is indicated above and in the following claims.

What I claim is:

1. In a handling machine suitable for use in the delivery of chassis frame units supported on an upper conveyor for advancing said units in closely adjacent dependent series: a lower conveyor for advancing said units in a substantially end-to-end arrangement; means for operating said lower conveyor at a greater speed than said upper conveyor and intermediate means for lowering the end of said units on said lower conveyor which advances said end to dispose the unit in horizontal position as the upper end is lowered.

2. In a handling machine suitable for use in the delivery of chassis frame units having an upper conveyor for advancing said units as a dependent series: a lower conveyor for advancing said units in a substantially end-to-end arrangement; means for supporting said units on said upper conveyor, intermediate means for engaging said supporting means to lower said units on said lower conveyor, and means for operating said lower conveyor at a greater speed than said upper conveyor to have the lower ends of the units advanced ahead of the upper ends as the upper ends are being lowered by the intermediate means.

3. In a handling machine suitable for use in the delivery of chassis frame units having an upper conveyor for supporting and advancing said units in closely adjacent dependent series: a lower conveyor for advancing said units in a substantially end-to-end arrangement; intermediate means for disengaging and transferring said units from said upper conveyor to said lower conveyor, and means for synchronizing the movement of said upper conveyor, said intermediate means and said lower conveyor, to have the latter advance the lower ends of said units ahead of the upper ends thereof when being lowered.

4. In a handling machine suitable for use in the delivery of chassis frame units and in combination with an upper conveyor for advancing said units as a dependent series: a lower conveyor for advancing said units in a substantially end-to-end arrangement; and intermediate means for transferring said units from said upper conveyor to said lower conveyor,—said intermediate means including fixed inclined guides for receiving and supporting one end of said units while the other end thereof is being advanced by the lower conveyor.

5. In a handling machine suitable for use in the delivery of chassis frame units having an upper conveyor for advancing said units as a dependent series: a lower conveyor operable at a higher speed than said upper conveyor for advancing said units in a substantially end-to-end arrangement; intermediate means for disengaging said units from said upper conveyor to said lower conveyor, laterally extending elements supporting said units at their upper ends and engageable by said disengaging means; and means for lowering said elements as the lower ends of said units are advanced by said lower conveyor.

6. In a handling machine suitable for use in the delivery of chassis frame units having an upper conveyor for advancing said units in closely adjacent dependent series: a lower conveyor for advancing said units in substantially horizontal arrangement; and intermediate means for transferring said units from said upper conveyor to said lower conveyor, including engageable elements operating at a speed lower than the speed of the lower conveyor to permit the lower conveyor to move the lower ends of the units ahead of the end supported on the intermediate means.

7. In a handling machine suitable for use in the delivery of chassis frame units and in combination with an upper conveyor for advancing said units as a dependent series: a lower conveyor for advancing said units in a substantially end-to-end arrangement; and intermediate means for transferring said units from said upper conveyor to said lower conveyor,—said transferring means including parts laterally so spaced as to permit the lower ends of said units to swing forward therebetween and said lower conveyor being so positioned and advanced relatively to said upper conveyor as to cause said lower ends to so swing forward.

8. In a handling organization for heavy units; an upper conveyor provided with means for supporting units in vertical arrangement; a lower conveyor advancing at a higher rate than said upper conveyor; and means for disengaging said units from said upper conveyor and lowering the same in substantially horizontal arrangement upon said lower conveyor, which advances the lower ends of the units ahead of the ends supported on the disengaging means.

9. In a handling organization for heavy units; an upper conveyor provided with means for supporting units in vertical arrangement; a lower conveyor advancing at a higher rate than said upper conveyor; and means for disengaging said units from said upper conveyor and lowering the same in substantially horizontal arrangement upon said lower conveyor, the lowering movement of the disengaging means being slower than the movement of the lower conveyor to permit the lower conveyor to engage and carry the lower ends of the units ahead of the upper downwardly moving ends thereof.

10. In a handling organization for heavy units; an upper conveyor provided with means for supporting units in vertical arrangement; a lower conveyor advancing at a higher rate than said upper conveyor; hangers for supporting said units and means for disengaging said hangers from said upper conveyor for lowering the ends thereof on the conveyor which are advanced as the hangers are lowered to dispose the units in substantially horizontal arrangement upon said lower conveyor.

11. In a handling organization for heavy units; an upper conveyor provided with means for supporting units in vertical arrangement; a lower conveyor advancing at a higher rate than said upper conveyor; parallel guides terminating adjacent said lower conveyor down which one end of the units slide while the other end is advanced by the lower conveyor; and means including chains laterally disposed in parallel planes and provided with blocks to lift said units successively from said hooks for advancing said units from said upper conveyor.

12. In a handling organization for chassis frames or the like; an upper conveyor for supporting and advancing said frames in vertical arrangement; a lower conveyor advancing at a greater rate than said upper conveyor; and an intermediate conveyor operating in a plane inclined downwardly between said upper and lower conveyors and in the direction of movement of said conveyors; said intermediate conveyor including means for removing said frames from said upper conveyor and transferring the same to said lower conveyor and operating at a speed slightly greater than said upper conveyor and sufficiently slower than said lower conveyor whereby said frames taken from said upper conveyor in vertical position are transposed to a horizontal end to end position on said lower conveyor when discharged from said intermediate conveyor.

13. The combination with a conveyor for supporting and transporting spaced elements, of means for individually disengaging an element from said conveyor and for lowering said element, and means for receiving and advancing one end of said element for moving it into a substantially horizontal position as it is lowered.

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