

March 24, 1959

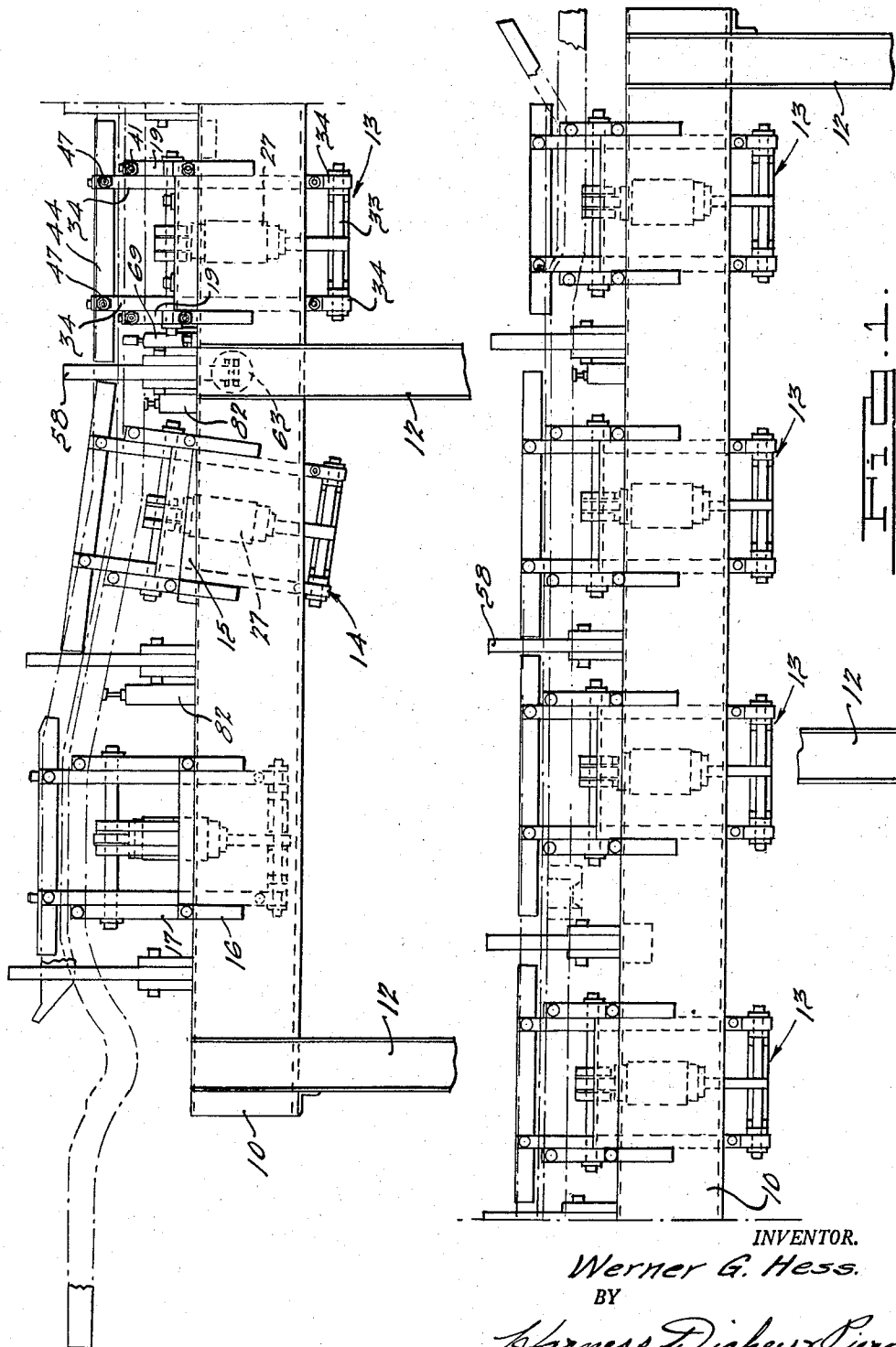
W. G. HESS

2,878,555

MACHINE FOR LOCATING AND CLAMPING A PAIR OF TELESCOPED
CHANNEL RAIL ELEMENTS INTO UNIT RELATIONSHIP

Filed Jan. 30, 1953

4 Sheets-Sheet 1



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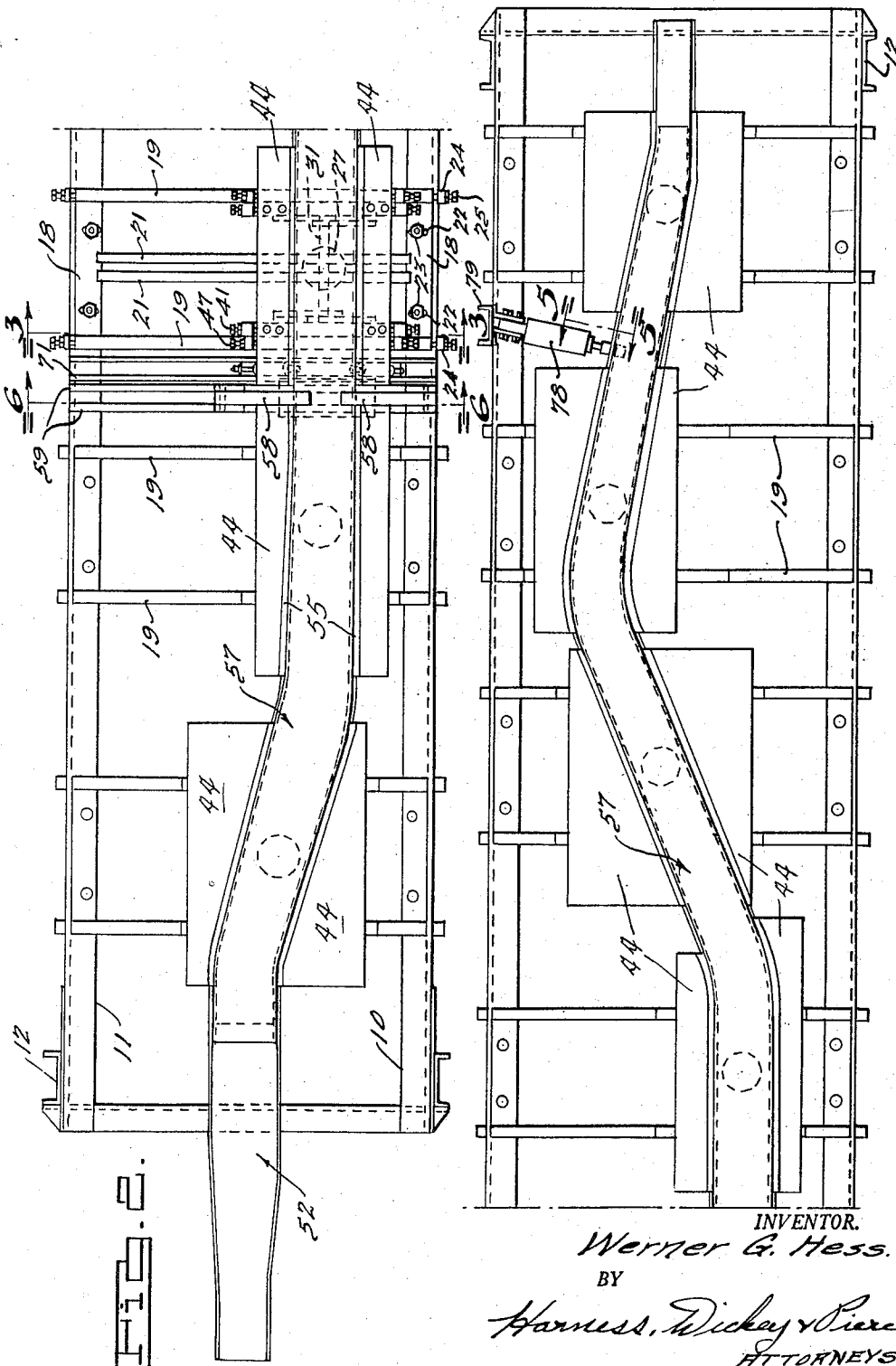
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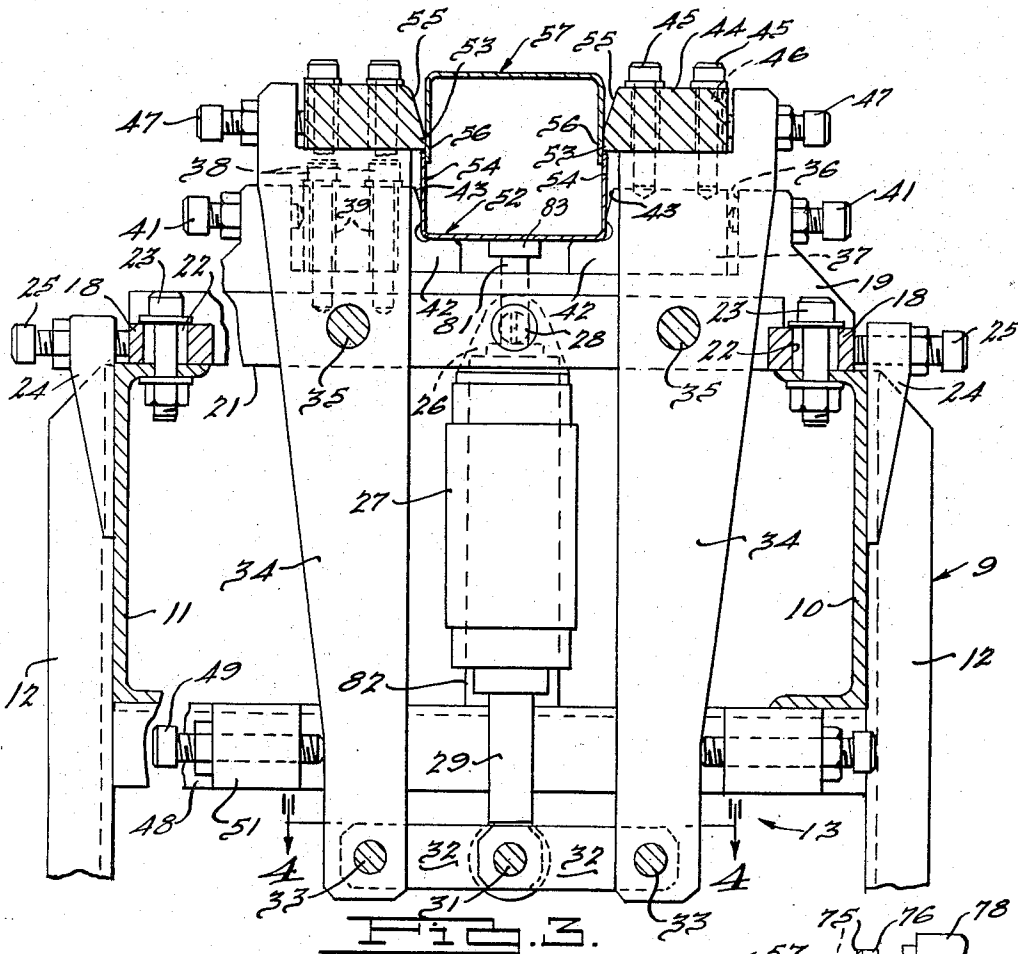


Fig. 3.

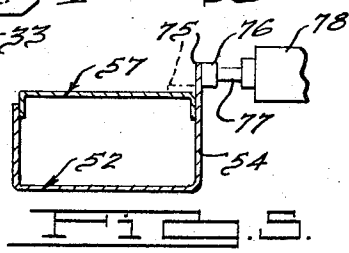


Fig. 5.

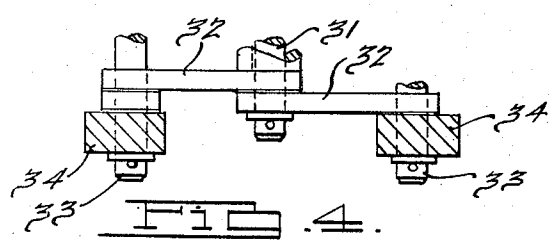


Fig. 4.

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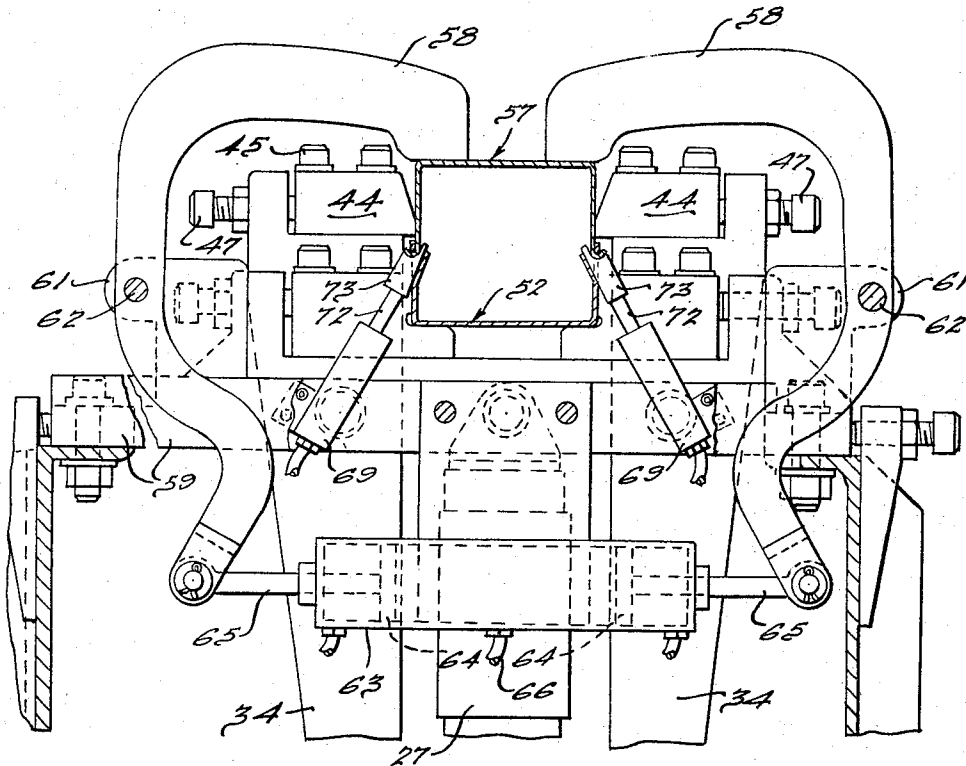


FIG. 6.

FIG. 7.

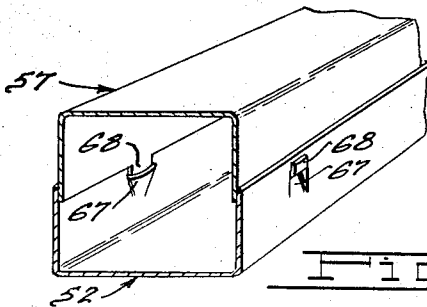
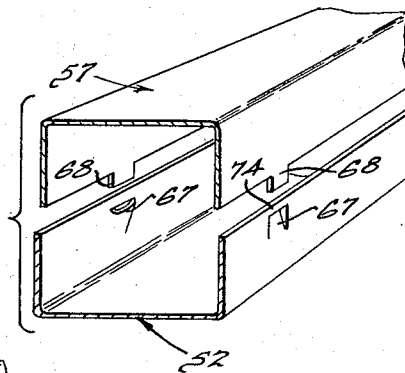


FIG. 8.

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MACHINE FOR LOCATING AND CLAMPING A PAIR OF TELESOPED CHANNEL RAIL ELEMENTS INTO UNIT RELATIONSHIP

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Application January 30, 1953, Serial No. 334,337

5 Claims. (Cl. 29—200)

This invention relates to machines for assembling parts together, and particularly to a machine for telescoping a pair of rail elements and securing them in telescoped relation.

The present invention pertains to a machine for telescoping rail elements to form side members for a chassis frame and securing them in locked position so that the rails will be in predetermined relation to each other during subsequent operations thereon. The telescoped rails are made from dies to provide predetermined channel form thereto, but in view of the contour of the rails, changing both in horizontal and vertical planes, difficulty has been experienced in telescoping the flanges of one channel rail into the flanges of the other channel rail. This difficulty is overcome in the present machine by providing supports for one of the rail elements which, after being placed therein, has the gauging members for the sides of the top inverted rail element move into position for receiving the flanges thereof. Pressure members force the inverted rail element downwardly while the gauging members force the flanges of the rail element inwardly so as to pass between the flanges of the bottom rail element as the top rail element is moved downwardly thereinto. Deflected stop members in the side flanges of the bottom rail element form accurately located gauging surfaces for limiting the telescoped relation of the flanges. Tabs are provided on the flanges of the inverted top rail element which pass through certain of the inwardly projected stop elements to extend outside of the flanges of the bottom frame element. After the downward movement of the top frame element has been completed, bending tools are then moved into engagement with the tabs to reversely bend the ends thereof back against the outer surface of the flanges of the bottom rail element, to thereby positively lock the two rail elements in fixed relation. In certain of the rail element assemblies, an upwardly projecting tab is provided on the flange of the bottom rail element which is deflected onto the web of the top element by a deflecting tool to retain the adjacent portion of the rail elements in fixed relationship. After the assembly of rail elements has been completed, the force applying members are retracted, the guide fingers for the flange of the top rail element are moved apart, and ejecting devices are actuated to raise the assembled rail elements from the machine.

Accordingly, the main objects of the invention are: to provide a machine for assembling telescoped rail elements into unit clamped relation to each other; to provide a machine having supports for one rail element with its flanges extending upwardly and guiding fingers for the top inverted rail element which are movable into position over the flanges of the bottom rail element for positioning the side flanges of the top frame element when forced downwardly by pressure exerting means within the flanges of the bottom rail element to assemble the rail elements in telescoped relation to each other; to provide stop means on the flanges of the bottom rail

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element which accurately position the edges of the flanges of the top rail element when the rail elements are in telescoped relation; to provide tabs on the ends of the flanges of the top rail element which project through the flanges on the bottom rail element when the rail elements are in assembled relation, which tabs are reversely deflected against the outer surface of the bottom rail element flanges to lock the two rail elements in fixed relation to each other; and, in general, to provide a machine for assembling channel-shaped rail elements into telescoped relation to each other which is simple in construction, positive in operation and economical of manufacture.

Other objects and features of novelty of the invention will be specifically pointed out or will become apparent when referring, for a better understanding of the invention, to the following description taken in conjunction with the accompanying drawings, wherein:

Figure 1 is a broken view in elevation of the machine of the present invention, showing the right and left-hand portions thereof;

Fig. 2 is a plan view of the two portions of the machine illustrated in Fig. 1;

Fig. 3 is an enlarged sectional view of the structure illustrated in Fig. 2, taken on the line 3—3 thereof;

Fig. 4 is a sectional view of the structure illustrated in Fig. 3, taken on the line 4—4 thereof;

Fig. 5 is an enlarged sectional view of the structure illustrated in Fig. 2, taken on the line 5—5 thereof;

Fig. 6 is an enlarged broken sectional view of the structure illustrated in Fig. 2, taken on the line 6—6 thereof;

Fig. 7 is an enlarged sectional view of the chassis rail elements before being moved in assembled telescoped relation; and

Fig. 8 is a view of the structure illustrated in Fig. 7 when in assembled relation.

In the figures, a base 9 of the machine is formed by channel-shaped side members 10 and 11 mounted on suitable supporting legs 12. In the device illustrated, seven pressure exerting elements 13 are illustrated, aligned throughout the length of the machine. All of these devices are similar, the device 14 having an angular support 15 thereon to follow the contour of the rail elements, while the device 16 has longer supporting arms 17 to support and operate on a still higher portion of the rail elements. Therefore, a single device will be described in detail, it being understood that the other six or more devices which may be employed are the same in construction and operation as the one described.

The top of the channel members 10 and 11 supports a spacing bar 18 having cross bars 19 at each end and a pair of spaced bars 21 in the center. The bars 18 have slots 22 through which screws 23 extend for clamping the bar on the channel frame members. Brackets 24 are welded to the outer face of the channel frame members 10 and 11, having adjusting screws 25 therein by which the bars 18 are accurately adjusted before screws 23 clamp the assembly to the frame members. The central bars 21 have the boss 26 of a cylinder 27 secured thereon by a pivot 28. The cylinder has a piston rod 29 extending from a piston therewithin, the end of which is secured by a pivot 31 to a pair of toggle links 32. The ends of the toggle links are secured by pivots 33 to a pair of arms 34 secured by pivots 35 to the bars 19.

The bars 19 have a recess 36 therein for receiving a pair of rail element supporting dies 37, secured thereon by screws 38 in slots 39 therein, permitting adjustment of the dies by the adjusting screws 41 before the dies are clamped in fixed relation to the bars 19. The dies 37 have flanges 42 on which the web of the bottom rail ele-

ment rests, being guided thereon by the sloping side portions 43. The pivoted arms 34 in like manner support die elements 44 which are secured thereto by screws 45 extending through slots 46, permitting the dies to be accurately adjusted by the adjusting screws 47 before being clamped in fixed relation to the arms. It is to be understood that a pair of dies 37 is fastened on each bar 19 of the device and a pair of arms 34 in like manner is mounted thereon, both of which sets of arms being operated by the rod 29 of the cylinder 27 which is centrally disposed therebetween. A bar 48 is mounted adjacent to each of the pair of arms 34 when secured to the bottom flange of the frame members 10 and 11. Adjusting screws 49 in bosses 51 on the bar 48 are engaged by the arms 34, to thereby limit the outward movement of the arms when moved by the toggle links 32 upon the downward movement of the piston rod 29.

When a pair of rail elements is to be secured in telescoped relation to each other, the bottom rail element 52 is first placed within the machine in position to rest upon the flanges 42 when guided thereinto by the sloping surfaces 43. Thereafter, fluid is admitted into the cylinder 27 for advancing the piston rod 29 and causing the lower ends of the arms 34 to be moved outwardly by the toggle links 32 for accurately positioning the faces 53 of the die elements 44 relative to the projecting flanges 54 of the bottom rail element 52. Sloping surfaces 55 on the die elements 44 guide the flanges 56 of the top rail element past the accurately positioned faces 53, to thereby deflect the flanges inwardly a sufficient amount to pass downwardly within the channel element 52 so as to be telescoped within the flanged member 54 thereof.

This downward movement is produced by C-shaped pressure exerting elements 58, as illustrated more specifically in Fig. 6. The element 58 are dispersed along the length of the machine, preferably between the seven pressure exerting devices provided thereon. A pair of bars 59 is secured on the top of the channel frame members 10 and 11, each having a boss 61 extending therefrom through which a pivot 62 extends for pivoting the C-shaped force applying elements 58 thereon. The bars support a cylinder 63 having a pair of spaced pistons 64 therein from which oppositely directed rods 65 extend from opposite ends of the cylinder. When fluid is admitted through a central conduit 66, both of the pistons move toward the ends of the cylinder, moving the rods 65 outwardly and rocking the C-shaped force applying elements 58 into engagement with the web of the top inverted rail element 57 and forces the rail element downwardly into telescoped relation to the bottom rail element.

Referring to Figs. 6 and 7, the bottom rail element has lanced, inwardly projecting stop bosses 67 at spaced points throughout the length thereof, which limits the downward movement of the flanges 56 of the rail element 57 relative to the flanges 54 of the bottom rail element 52. This limiting of the downward movement of the flanges 56 accurately locates the webs of the two channel elements relative to each other. The flanges 56 have tabs 68 thereon which are aligned with certain of the stop bosses 67 so as to pass downwardly therein to extend outwardly of the outer surface of the flanges 54. At points along the machine, where the tabs 68 are located, cylinders 69 are mounted on a cross bar 71 having piston rods 72 extending therefrom which carry bending dies 73 on the ends. After the two channel rails are moved into telescoped relationship, the operation of the rod 72 by the piston and cylinder 69 forces the bending dies 73 upwardly to roll the tabs 68 around the bridging portion 74 of the flanges 54 above the bosses 67 to thereby firmly secure the two rail elements in fixed relation to each other.

When one of the rail elements is of shallow depth, as at one end of the top rail 57 to reduce the width of the end of the assembled rails, the outer flange 54 may have a tab 75 extending upwardly therefrom which is wiped

over the web of the channel 57 by the die 76 as illustrated in Fig 5. The die 76 is mounted on the end of a rod 77 which is actuated by a piston within a cylinder 78 which is secured to the frame member 11 by the channel member 79. The tab 75, when flanged over the web of the rail element 57, prevents the separation of the webs at the point where the rail element is of shallow depth. After the two rail elements are moved into telescoped relationship and locked therein by the flanging of the tabs 68 and 75, the flanging dies 76 and 73 are retracted, the pistons 64 are moved toward each other within the cylinder 63, to thereby rock the C-shaped force applying elements 58 in reverse direction out of engagement with the assembled rail elements and sufficiently apart to permit the rail elements to pass upwardly therebetween. The rods 29 are then retracted within the cylinders 27 to move the lower ends of the arms 34 toward each other, thereby moving the dies 44 outwardly away from the assembled rail elements, and rods 81 in cylinders 82 which may be mounted upon the cross bar 48 move a head 83 upwardly into engagement with the assembled rails to thereby eject the assembled rails from the die elements of the machine.

While heretofore difficulty was experienced in attempting to telescope a pair of channel rail elements, which are of substantial length and which vary in contour from both horizontal and vertical planes, in unit relation to each other, the present machine has simplified the assembly. The machine accurately locates the one channel element and accurately positions the sides of the flanges of the other rail element as it is forced downwardly into telescoped relation with the first rail element by pressure exerting devices provided at spaced points throughout the length of the rail elements. By thereafter flanging over interengaging tabs on the flanges of the rail elements, the rail elements are positively locked into telescoped relation, with the webs thereof accurately positioned relative to each other. This locking occurs through the engagement of tabs on the flanges of one rail element with stop bosses provided on the flanges of the other rail element and through the engagement of a tab on the flange of the last said rail element with the web of the first said rail element. After all of the devices are retracted, the operation of the ejecting rods in the cylinder raises the assembled rail element upwardly from the dies so that it may be removed from the machine.

What is claimed is:

1. In a machine for interfitting the flanges of two channel-shaped rail elements, the combination including, a base, a plurality of devices on said base, each device embodying a supporting means for the one rail element with its flanges extending upwardly, a pair of movable arms on at least some of said devices having means thereon which are movable toward each other from opposite sides of the one rail element above the flanges thereof for accurately locating the downwardly presenting flanges of a second rail element placed therebetween and above the first rail element, pressure applying means movable laterally and downwardly into engagement with the web of the second rail element which moves it downwardly into telescoped relation with the first rail element, stop means provided on the flanges of one of the rail elements which accurately positions the webs of the two rail elements in spaced relation to each other, and actuatable means on said base for interengaging portions of said rail elements and locking said rail elements in telescoped relation while said pressure applying means retains the webs of the two rail elements in accurate spaced relation.

2. In a machine for interfitting the flanges of two channel-shaped rail elements, the combination including, a base, a plurality of devices on said base, each device embodying a supporting means for the one rail element with its flanges extending upwardly, a pair of movable arms on at least some of said devices having means thereon which are disposed on opposite sides of the one rail element and movable transversely thereof toward the

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center of the one rail element about the flanges thereof for accurately locating the downwardly presenting flanges of a second rail element when placed therebetween and above the first rail element, pressure applying means movable over the second rail element and downwardly to move the second rail element downwardly into telescoped relation with the first rail element until stop means provided on the flanges of at least one of said rail elements accurately positions the webs of the two rail elements in spaced relation to each other, and means operable after the first two rail elements have been moved into assembled relationship for deflecting tabs on one of the rail elements which extend through apertures in the other rail elements to thereby lock the rail elements in assembled relation.

3. In a machine for interfitting the flanges of two channel-shaped rail elements, the combination including, a base, a plurality of devices on said base each device embodying a supporting means for the one rail element with its flanges extending upwardly, a pair of movable arms on at least some of said devices having means thereon which are disposed on opposite sides of the one rail element and movable transversely thereof toward the center of the one rail element above the flanges thereof for accurately locating the downwardly presenting flanges of a second rail element when placed therebetween and above the first rail element, pressure applying means movable over the second rail element and downwardly to move the second rail element downwardly into telescoped relation with the first rail element until stop means provided on the flanges of one of the rail elements accurately positions the webs of the two rail elements in spaced relation to each other, tabs on one of said rail elements, and means operable while the two rail elements are retained in assembled relationship for deflecting said tabs about portions of the other rail element to thereby lock the rail elements in assembled relation.

4. In a machine for interfitting the flanges of two channel-shaped rail elements, the combination including, a base, a plurality of devices on said base each device embodying a supporting means for the one rail element with its flanges extending upwardly, a pair of movable arms on at least some of said devices having means thereon located on opposite sides of said one rail element above the flanges thereof and movable toward the center of the one rail element for accurately locating the downwardly presenting flanges of a second rail element when placed

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therebetween and above the first rail element, pressure applying means movable downwardly into telescoped relation with the first rail element until stop means provided on the flange of one of the rail elements accurately positions the webs of the two rail elements in spaced relation to each other, means on said base for deflecting a portion of the first rail element over the second rail element to prevent the separation thereof, and means engaging the bottom web of the assembled rail elements for raising it from the machine after the movable elements in engagement with the rails are moved to retracted position.

5. In a machine for interfitting the flanges of two channel elements, the combination including, a base, supporting means on said base for one channel element with its flanges extending upwardly, a pair of movable arms on said base having means thereon located on opposite sides of said one channel element above the flanges thereof and having surfaces sloping downwardly thereover for deflecting the downwardly presenting flanges of a second channel element placed above the first channel element so that they will enter therebetween, pressure applying means on said base movable laterally and downwardly into engagement with the web of said second channel element which is moved downwardly thereby into telescoped relation with the first channel element until stop means provided on the flanges of one of the channel elements are engaged by the other channel element to accurately position the webs of the two channel elements in spaced relation to each other, and means on said base for deflecting and interlocking a portion of one of said channel elements when the channel elements are retained in telescoped relation for retaining them in telescoped relation when removed from the machine.

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