Dec. 16, 1958 E. A. MARRYATT 2,864,542

COMBINATION LADDER AND CHUTE

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FIG. 1

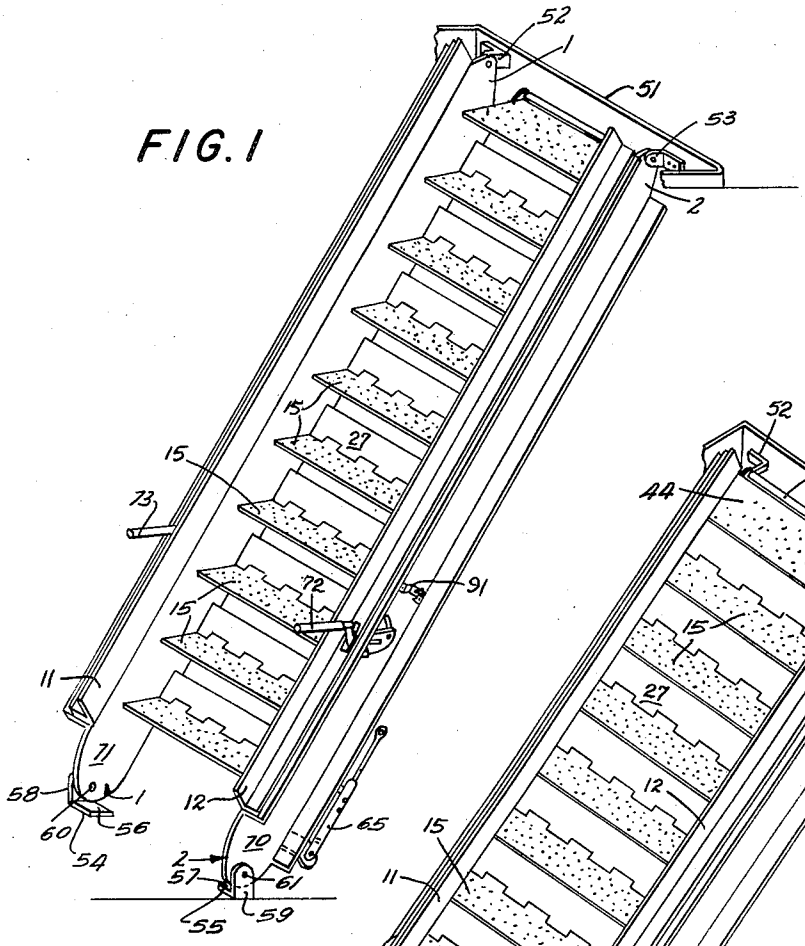
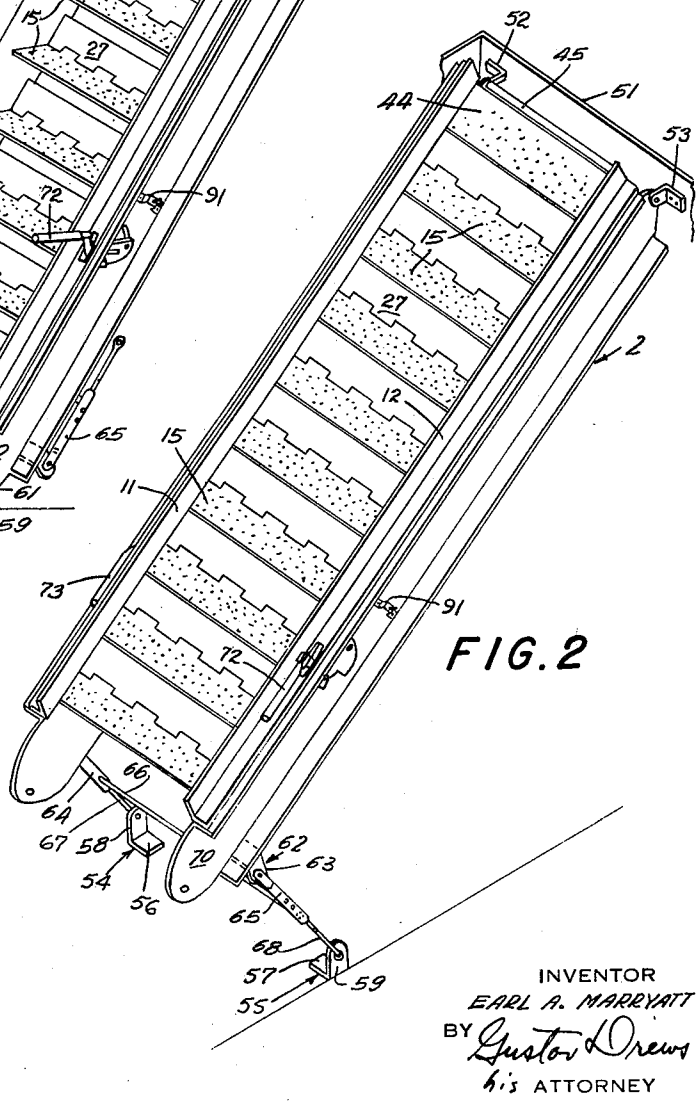


FIG. 2



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FIG. 3

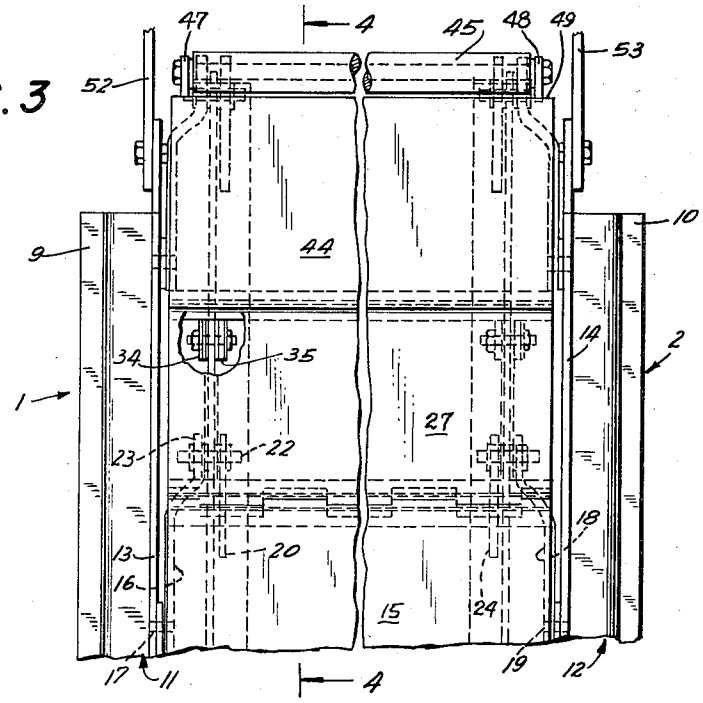


FIG. 4

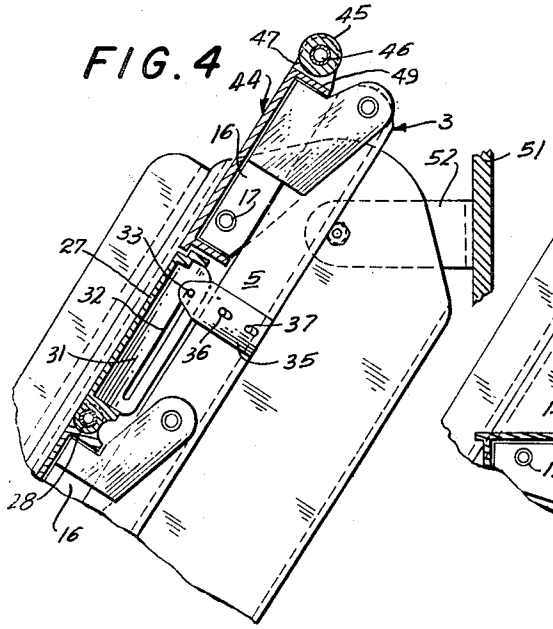
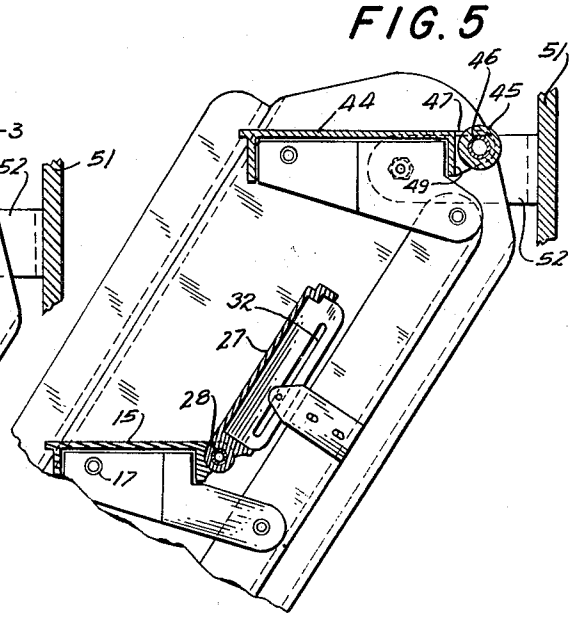


FIG. 5



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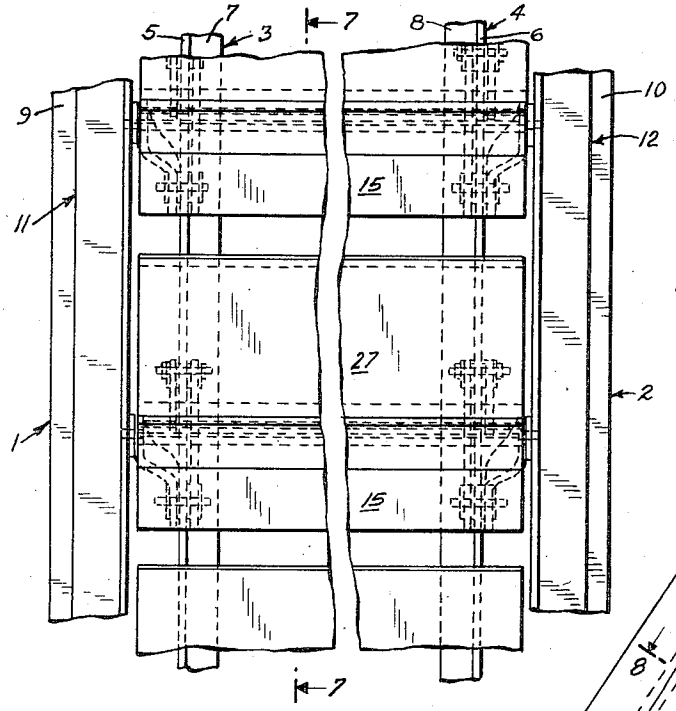


FIG. 6

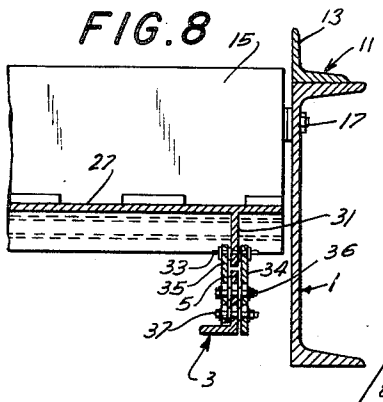


FIG. 8

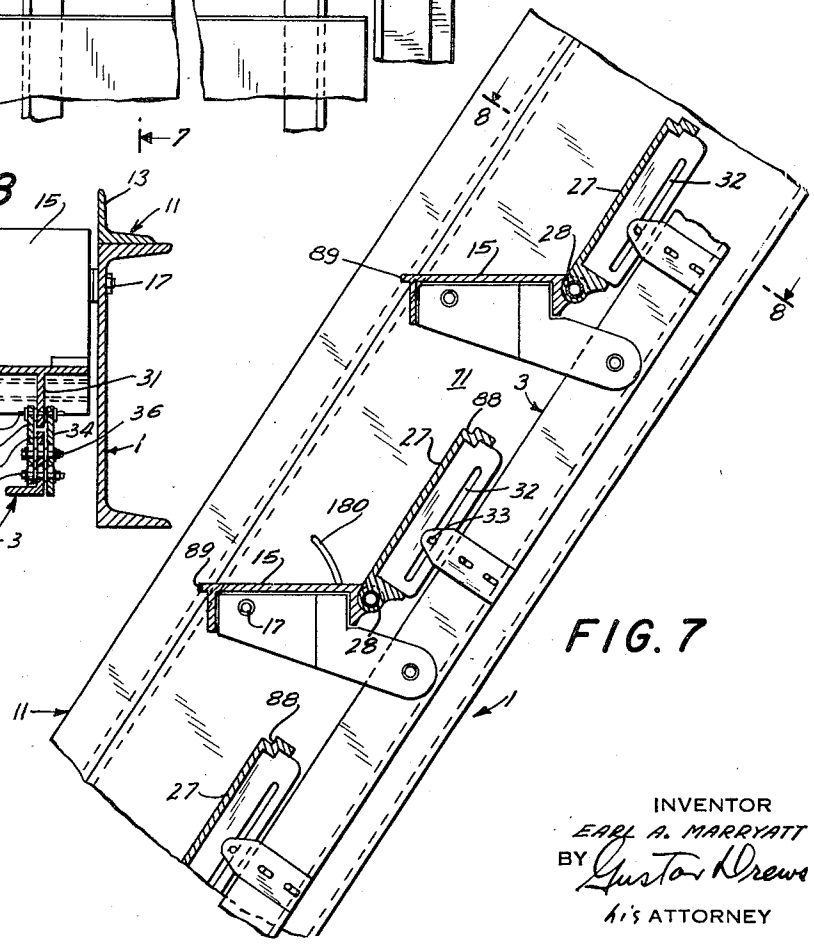


FIG. 7

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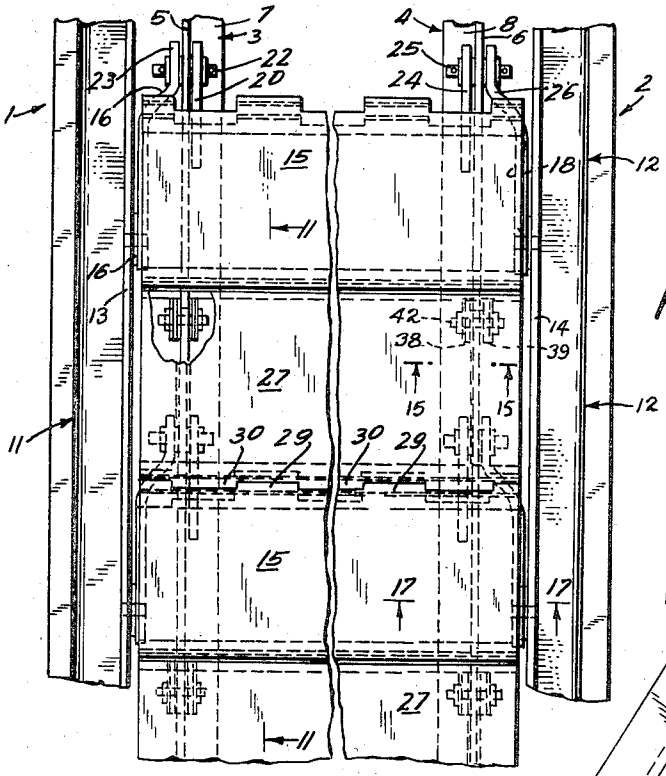


FIG. 9

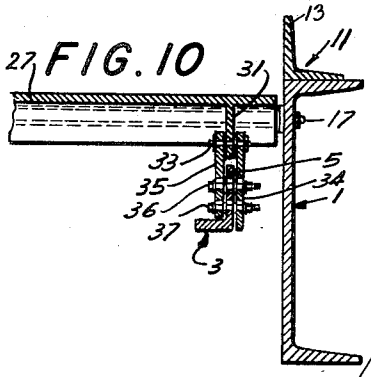


FIG. 10

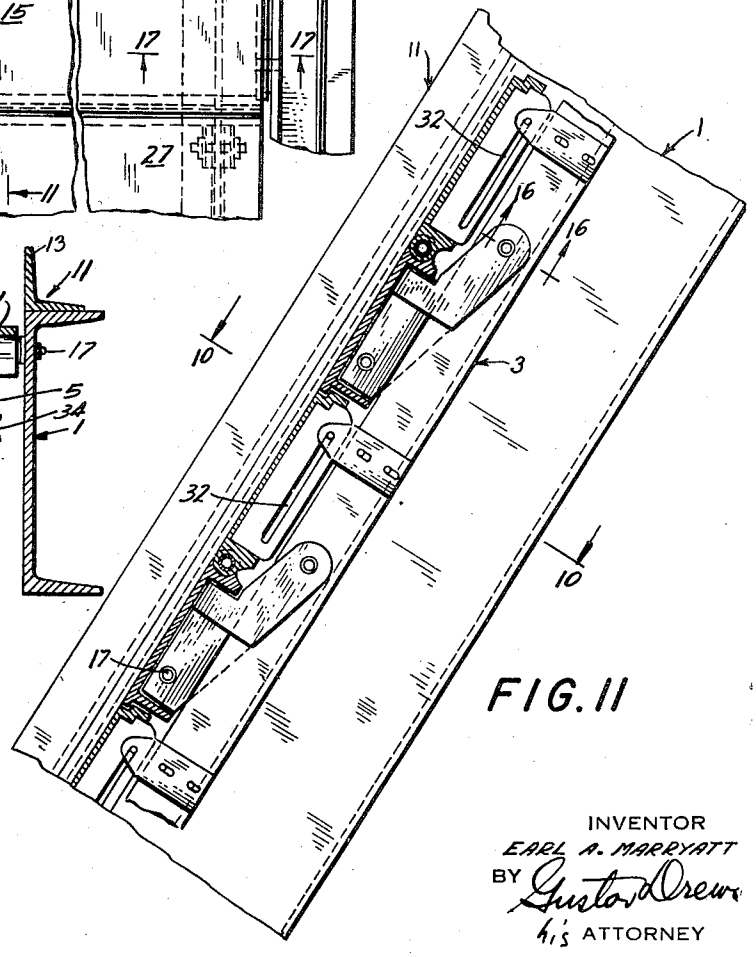


FIG. 11

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COMBINATION LADDER AND CHUTE

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FIG. 12

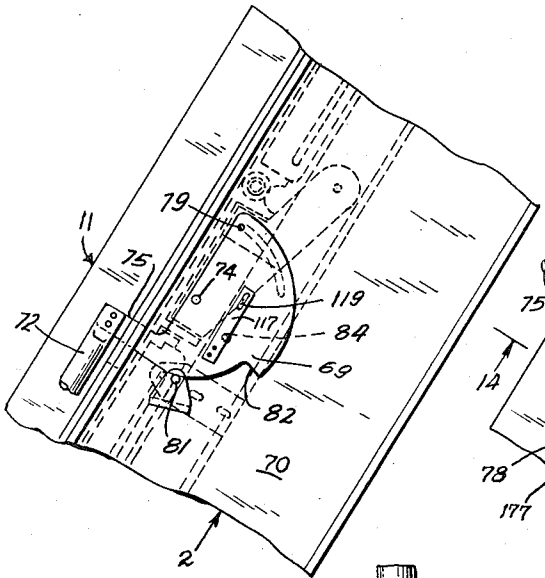
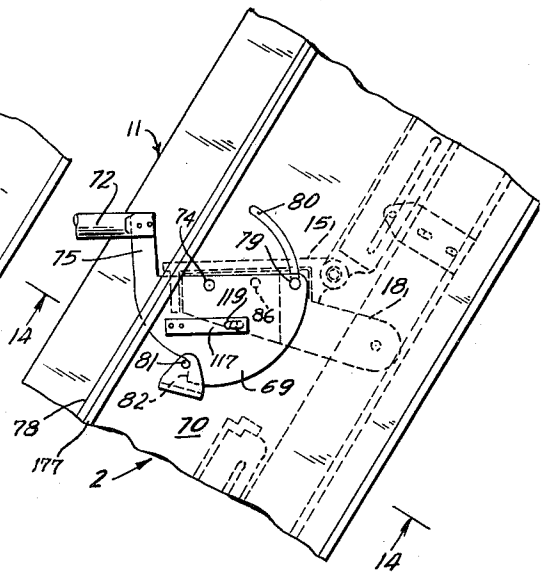


FIG. 13



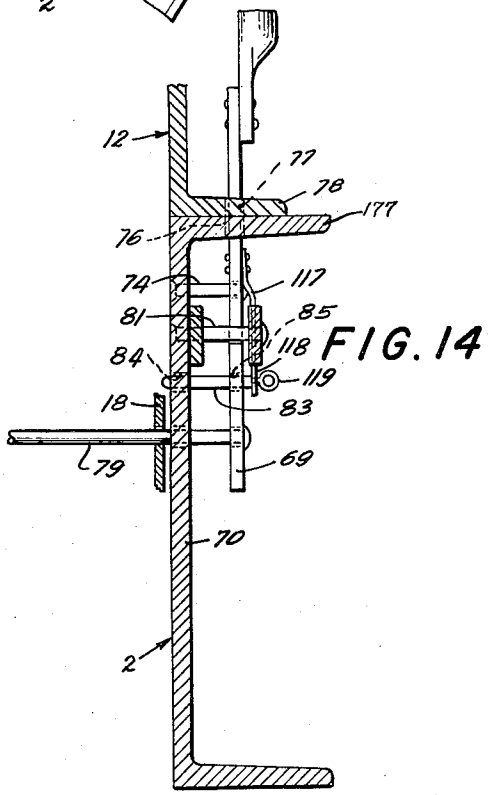


FIG. 14

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COMBINATION LADDER AND CHUTE

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FIG. 15

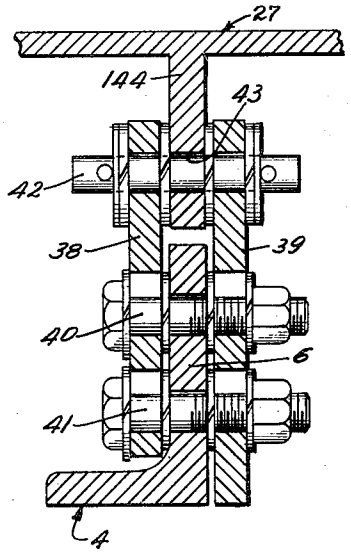


FIG. 16

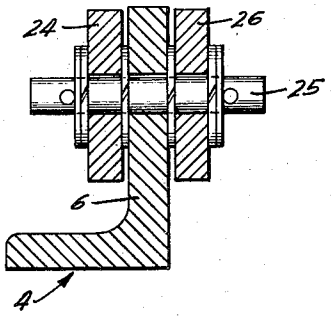


FIG. 18

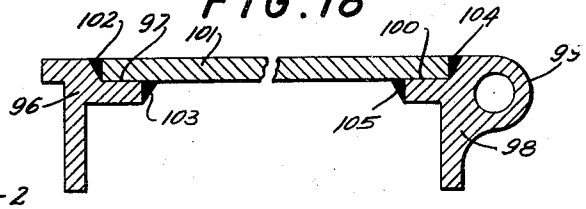


FIG. 17

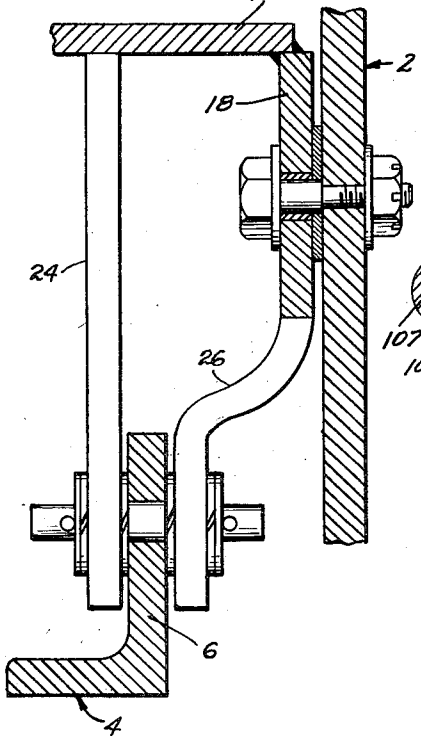
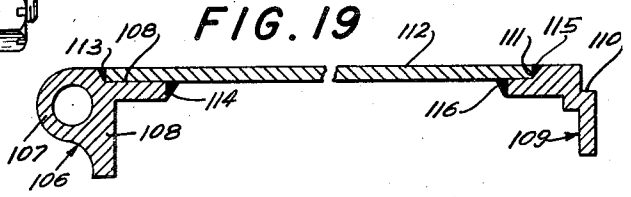


FIG. 19



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FIG. 20

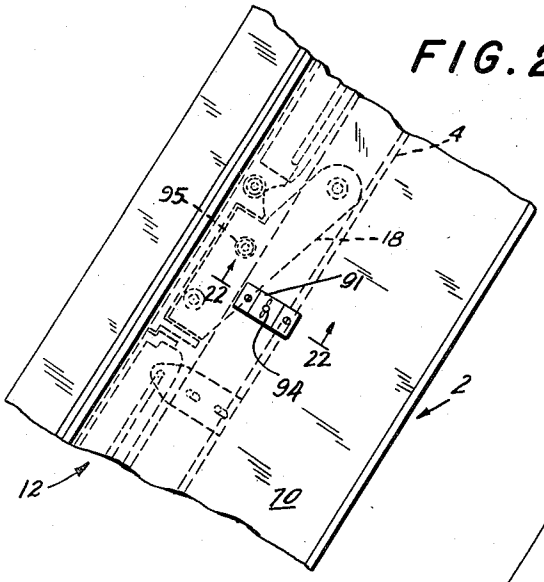


FIG. 21

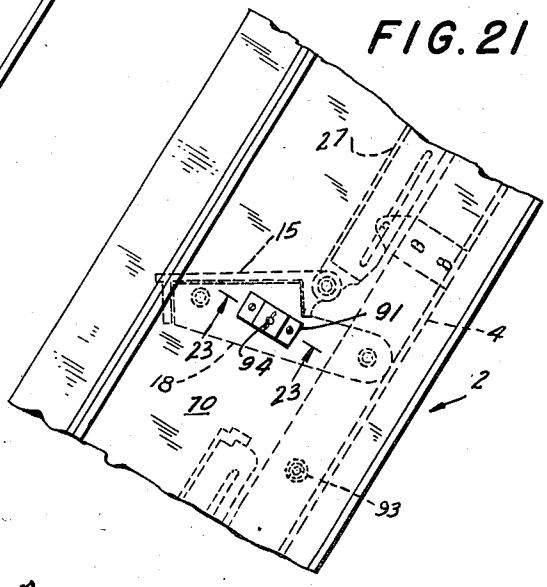
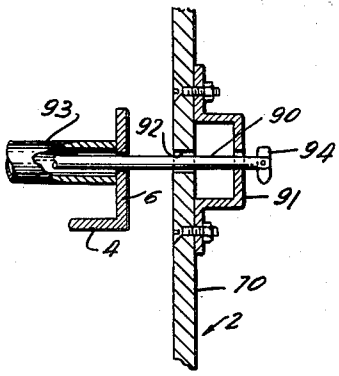


FIG. 22



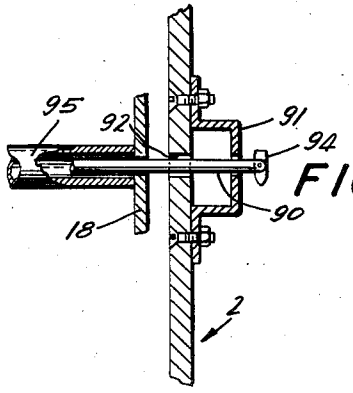


FIG. 23

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United States Patent Office 2,864,542 Patented Dec. 16, 1958

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COMBINATION LADDER AND CHUTE

Earl A. Marryatt, Closter, N. J., assignor of fifty percent to Alexander C. Kidd, South Orange, N. J.

Application October 18, 1957, Serial No. 691,007

20 Claims. (Cl. 228—2)

This invention relates to a combination ladder and chute, more particularly for use on sea going vessels, naval vessels, and the like.

In the interest of conserving space on sea going vessels to increase the space available for freight and passengers, and on naval vessels not only for freight and crew, but also for equipment, armament, and the like, it has long been the desire to dispense with unnecessary equipment whenever possible. However, in the case of indispensable equipment such as ladders and chutes, the areas provided for ladders to enable travelling from one deck to another are generally also used for chutes to convey cargo from one deck to another. In such cases, either there are provided a separate chute and ladder which replaced one another according to the use required of the same and the item not used would then have to be stored away and occupy valuable space or else the ladder remain in place, and a separate chute or the like temporarily installed and then when not in use removed or stored away. This storage space, therefore, is necessary dead space which in the case of large vessels might call for several hundred cubic feet of space.

With the foregoing in mind, one of the objects of the present invention is aimed to provide a combination ladder and chute which dispenses with the retention of dead storage space which combination is characterized by movably mounted treads and intervening chute plates which can be actuated with facility in one position to serve as a ladder or staircase and in another instance serve as a chute merely by actuating the treads and intervening chute plates in one instance to have the treads positioned in successive parallel levels to be used as a ladder or staircase and in the other instance to be positioned with the intervening chute plates in substantial alinement with one another to produce a substantially plain face to serve as a chute.

It is also an object of the present invention not only to provide a combination ladder and chute in which treads and intervening chute plates may be actuated from a ladder position into a chute position and again into a ladder position according to the requirement but also to facilitate anchoring not only the treads in ladder position and in chute position but also anchor the apparatus at different levels possibly at a steeper grade for apparatus to be used as a ladder and at a lesser grade when the apparatus is to be used as a chute.

These and other features, capabilities, and advantages of the invention will appear from the subjoined detailed description of the embodiments illustrated in the accompanying drawings, in which:

Fig. 1 is a perspective of the device in ladder forming position.

Fig. 2 is a perspective of the same in chute forming position.

Fig. 3 is an enlarged fragmental front elevation in chute forming position of the upper part of the device.

Fig. 4 is a section on the line 4—4 of Fig. 3 in chute forming position.

Fig. 5 is a section on the line 4—4 of the part of the device shown in Fig. 3 but in ladder forming position.

Fig. 6 is an enlarged fragmental elevation in ladder forming position of an intermediate part of the device.

Fig. 7 is a section on the line 7—7 of Fig. 6.

Fig. 8 is a section on the line 8—8 of Fig. 7.

Fig. 9 is an enlarged fragmental front elevation in chute forming position of the intermediate part of the device illustrated in Fig. 6.

Fig. 10 is a section on the line 10—10 of Fig. 11.

Fig. 11 is a section on the line 11—11 of Fig. 9.

Fig. 12 is a fragmental side elevation in chute forming position of the lower part of the device.

Fig. 13 is a fragmental side elevation in ladder forming position of the lower part of the device shown in Fig. 12.

Fig. 14 is a section on the line 14—14 of Fig. 13.

Fig. 15 is a section on the line 15—15 of Fig. 9.

Fig. 16 is a section on the line 16—16 of Fig. 11.

Fig. 17 is a section on the line 17—17 of Fig. 9.

Fig. 18 is a fragmental modification of the tread partly in section.

Fig. 19 is a fragmental modification of the intervening chute forming plate partly in section.

Fig. 20 is a fragmental side elevation of the intermediate part of the device which receives the anchoring or lock pin showing a tread plate and intervening chute plates in chute forming position in dotted lines.

Fig. 21 is a fragmental side elevation of the part of the device shown in Fig. 20 showing a tread plate and intervening chute plates in ladder forming position.

Fig. 22 is a section on the line 22—22 of Fig. 20.

Fig. 23 is a section on the line 23—23 of Fig. 21.

In the embodiment shown in Figs. 1 to 17 inclusive and Figs. 20 to 23 inclusive, the device constituting a combination ladder and chute consists essentially of two outer channels 1 and 2 constituting the main frame. Inside of the channels 1 and 2 there are operable the adjusting angles 3 and 4. The adjusting angles 3 and 4 have their outer webs 5 and 6 extending upwardly and their inner webs 7 and 8 respectively extending toward one another. On the upper webs 9 and 10 of the channels 1 and 2 respectively there are positioned the guide angles 11 and 12 respectively having their inner webs 13 and 14 extending upwardly alongside of the inner edges of the channels 1 and 2 respectively. The channels 1 and 2 are operably connected to one another by the tread plates 15. The tread plates 15 extend from the inner face of the channel 1 to the inner face of the channel 2. Adjacent the channel 1 the tread plates 15 have the downwardly extending fins 16 which are pivotally connected to the intermediate web of the channel 1 by the pins 17. Adjacent the inner face of the channel 2 the tread plates 15 are provided with the downwardly extending fins 18 which are pivotally connected to the intermediate web of the channel 2 by the pins 19 which are in alinement with the pins 17, that is, the pin 17 of each tread plate 15 is in alinement with the pin 19 of such tread plate so that all of the tread plates 15 may be pivoted a like inclination relative to the channels 1 and 2 about their pins 17 and 19.

In addition to the fins 16 and 18 each tread plate is also provided with short fins 20 and 24 respectively, the fins 20 having pins 22 which extend through the web 5 of the adjusting angles 3 and into the forward or upward extensions 23 of the fins 16 which extensions 23, see Figs. 3 and 9, are bent inwardly toward the web 5 of the adjusting angle 3 so that the extensions 23 of the fins 16 and the fins 20 of the tread plate 15 are pivotally connected to the web 5 of the adjusting angle 3. Similarly, adjacent the web 6 of the adjusting angle 4 there are positioned the fins 24 extending downwardly from the

tread plates 15 and are pivotlaly connected by the pins 25 to the web 6 of the adjusting angle 4. These pins 25 also extend through the extensions 26 of the fins 18 which extensions 26 are bent away from the channel 2 toward and adjacent to the web 6 of the adjusting angle 4. From the foregoing it will thus appear that the tread plates 15 are pivotally connected at one end by the pins 17 and 19 to a relatively stationary frame consisting of the channels 1 and 2 and at their other ends pivotally connected to the webs 5 and 6 of the angle plates 3 and 4 which constitute a movable frame relative to the frame formed by the channels 1 and 2.

Intermediate or in between successive tread plates 15 there are provided the chute plates 27 which are pivotally connected at their lower ends to the upper ends of the tread plates 15 by the hinge pins 28. In other words each tread plate 15, see Figs. 5 and 7, is connected to a tread plate 27 by a hinge pin 28, the adjacent ends of each pair of consisting of a tread plate and a chute plate being formed into nesting pin receiving journals 29 and 30, Fig. 9. All of the chute plates 27 are in turn slidably connected to the adjusting angles 3 and 4, the one side of each chute plate 27 having a fin 31 provided with a slot 32 to receive a pin 33 in the cheek plates 34 and 35 which are connected by pins 36 and 37 to the web 5 of the adjusting angle 3 and the web 6 of the adjusting angle 4 is provided with the cheek plates 38 and 39 secured to the web 6 by the pins 40 and 41. Through the upper ends of the cheek plates 38 and 39 which extend, Fig. 15, beyond the free edge of the web 6, there is provided a pin 42 which extends through the slot 43 in the fin 144. Obviously the pin 33 extending through the slot 32 also passes through the end portions of the cheek plates 34 and 35 which project beyond the free edge of the web 5. The slots 32 and 43 extend substantially parallel to the plates 27 so that when the adjusting angles 3 and 4 are actuated downwardly into the position shown in Figs. 5 and 7, the tread plates 15 will be tilted into an inclined position relative to the chute plates 27 and the chute plates 27 positioned away from the upper edges of the channels 1 and 2 and in turn when the adjusting angles 3 and 4 are moved upwardly from the position shown in Figs. 1, 5 and 7 into the position shown in Figs. 2, 4 and 11, the pins 33 and 42 will move into the upper ends of the slots 32 and 43 and the tread plates 15 and chute plates 27 will move into alinement with one another adjacent the upper edges of the channels 1 and 2 as shown in Figs. 2, 4, and 11.

Preferably, as shown in Figs. 3, 4 and 5, adjacent the upper edge of the uppermost tread plate 44 there is provided the roller 45, the ends of the shaft 46 of which are journalled in the brackets 47 and 48 secured, as an instance, by welding on the flange or nose piece 49, extending downwardly from the upper end of the tread plate 44. The tread plate 44 as clearly shown in Figs. 2, 3, 4 and 5 are wider than the tread plates 15 in order to reduce the space between the coaming 51 and the roller 45 in ladder forming position, that shown in Figs. 1 and 5. Since the roller 45 is disposed adjacent to the coaming 51 in ladder forming position, there is of course little danger of the user of the tread plate 44, in ladder forming position, to slip as a result of stepping upon the roller 45. In turn when the device is in chute forming position, that shown in Figs. 2 and 4, the roller 45 will be free to be engaged by the freight, baggage, and the like which is fed to the device to be advanced under its own momentum along the tread plates 44, 15 and chute plates 27.

In order to anchor the channels 1 and 2 in substantially stationary position relative to one another and to the decks of the vessel, the upper ends of the intermediate webs of the channels 1 and 2 will be provided with the angle brackets 52 and 53, one leg of which will be pivotally connected to the channels 1 and 2 respectively and the other leg or base of which will be fixed to the coaming 51. In turn when in ladder forming position the lower deck preferably will have anchor brackets 54 and 55 similar to the brackets 52 and 53 having their bases 56 and 57 respectively secured to the lower deck and their upwardly extending legs 58 and 59 respectively pivotally connected to the lower ends of the intervening webs of the channels 1 and 2 by the pins 60 and 61 respectively. Preferably the pins 60 and 61 are removable so that when it is desired, see Fig. 2, to use the device as a chute the lower end may be raised into the position shown in Fig. 2 as compared to the position shown in Fig. 1 where the device is formed into ladder forming position. Supporting the lower end of the device in the raised position shown in Fig. 2 angle brackets 62 are connected to the lower faces of the channels 1 and 2 which brackets have downwardly extending legs 63 to which are pivotally connected the cylindrical bars 64 and 65 which are secured to one another by the brace rod 66, Fig. 2. In a ladder forming position these bars 64 and 65 may be folded up into the position shown in Fig. 1. Slidably mounted in the cylindrical bars 64 and 65 there are provided the rods 67 and 68 respectively, the lower ends of which will be pivotally connected to the legs 58 and 59 of the brackets 54 and 55 respectively as hown in Fig. 2. In order to anchor the rods 67 and 68 in the desired projected position, any suitable means such as pins may be provided extending through the cylindrical bars 64, 65 into locking engagement with the rods 67 and 68 respectively.

The mechanism for actuating the device from the ladder forming position shown in Fig. 1 into the chute forming position shown in Fig. 2 and vice versa from the chute forming position in Fig. 2 to the ladder forming position shown in Fig. 1 consists essentially of plates such as the plates 69, one adjacent the intermediate web 70 of the channel 2 and another plate in alinement with the plate 69 adjacent the intermediate web 71 of the channel 1. The plate 69 adjacent the web 70 is provided with the handle 72 and the actuating plate similar to the plate 69 adjacent the intermediate web 71 is provided with a handle 73. The handles 72 and 73 and actuating plates adjacent the intermediate webs 70 and 71 are in alinement with one another and pivotally connected to the intermediate webs 70 and 71, the plate 69 being pivotally connected to the plate 70 by the pin 74. The handles 72 and 73 are formed at the ends of arms, such as the arm 75 to which the handle 72 is connected, which arm 75 and plate 69 extends through the alined slots 76 and 77 in the upper web 177 of the channel 2 and the lower leg 78 of the guide rail 12. The lever 73 is connected to a similar arm extending through fins or webs of the channel 1 and guide rail 11. The upper end of the plate 69 is connected to the rod 79 which extends through the arcuate slot 80 in the intermediate web 70 of the channel 2 and then through the fins 18 and 16 of the tread plate 15. The rod 79 also extends through the arcuate slot 180 formed in the intermediate web 71 of the channel 1 and then passes through and is connected to an actuating plate similar to the actuating plate 69 connected to the handle 73. In the present instance the tread plate 15, see Fig. 1, to which the rod 79 is connected is the third from the bottom of the ladder. Preferably there is provided a stop pin 81 formed in the intermediate web 70 to cooperate with the shoulder 82 on the plate 69 to determine the ladder forming inclination of the tread plates 15 as shown in Fig. 13. When the pin 81 so engages the shoulder 82, the rod 79 also engages the lower end of the arcuate slot 80 and to this extent the cooperation of the pin 79 with the lower end of the arcuate slot 80 in turn cooperates with the cooperation of the pin 81 with the shoulder 82 to determine the inclination of the tread plates 15 in ladder forming position.

When in ladder forming position as shown in Fig. 13, the tread plates 15 may be anchored in this position by the cooperation of the lock pin 83 Fig. 14 with the open-

ing 84 in the intermediate web 70 of the channel 2. In turn, when the tread plates 15 are in chute forming position, that shown in Fig. 12, the lock pin 83 may extend through the opening 85 in the actuating plate 69 and then into the opening 86 in the intermediate web 70 of the channel 2. The actuating plate connected to the lever 73 adjacent the intermediate web 71 of the channel 1 is equipped with similar pins 74, 81, and 83 for similar cooperation with conformations in the actuating plate adjacent the intermediate web 71 of the channel 1 and with similar conformations in the intermediate web 71 of the channel 1.

Due to the fact that the several tread plates 15 are connected to the adjusting angles 3 and 4, the actuation of the levers 72 and 73 will simultaneously actuate all of the tread plates 15 and chute plates 27.

To facilitate alinement of the tread plates 15 with successive chute plates 27 which are not hingedly connected to one another, the upper or free edges of the chute plates 27 are provided with recessed shoulders 88 to receive the lower free edges 89 of the tread plates 15. The successive pairs of hingedly connected tread plates 15 and chute plates 27 are of course so spaced from one another on the adjusting angles 3 and 4 that the recessed shoulders 88 of chute plates 27 will receive the free edges 89 of tread plates in chute forming position as shown in Figs. 4 and 11.

In addition to the locking pins 83 for anchoring the tread plates 15 and chute plates 27 in ladder forming position or in chute forming position, the lock pin 90 shown in Figs. 20 to 23 inclusive is provided. The lock pin extends through the bracket 91 mounted on the intermediate web 70 of the channel 2 and then through the opening 92 through the adjusting angle 4 and then through the tube 93 extending from the web 6 to the web 5 of the adjusting angle 3 and then through the intermediate web 71 of the channel 1. Preferably the end of the rod 90 as shown in Fig. 22 will have a toggle lever 94 formed at its end to prevent moving the rod 90 out of position. Preferably the other end of the rod 90 may also be provided with a toggle link or lever to cooperate with a bracket similar to the bracket 91 formed on the intermediate web 71 of the channel 1. When the locking rod 90 extends through the webs 6 and 5 of the adjusting angles 4 and 3 respectively, then the locking rod 90 will cooperate with the pin 83 when it registers with the recess 86 to anchor the tread plates 15 and chute plates 27 in chute forming position, that shown in Fig. 20. In turn when the tread plates 15 and chute plates 27 are actuated into ladder forming position, that shown in Fig. 21, then the rod 90, see Fig. 23, after passing through the housing 91 and opening 92 will pass through the outer fin 18 of the tread plate 15 and then through the tube 95 which connects the fin 18 of the tread plate 15 with the outer fin 16 of the tread plate 15 and then passes through the intermediate web 71 of the channel 1. As shown in Figs. 1 and 2, the rod 90 will extend under the fourth tread plate 15 from the bottom in chute formation and into the fins 16 and 18 of the fourth tread plate 15 from the bottom of the ladder in ladder formation.

Instead of forming the tread plates and chute plates in one piece, they may be formed into three pieces, as an instance see Fig. 18. The tread plates may each have a standard lower end 96 having a recess 97 and an upper section 98 provided with the hinge extension 99 and a recess 100. When the tread plates are made into three parts, the sections 96 and 98 may be standard for tread plates having different widths of tread faces. Consequently, the tread plate portions 101 may be made of different widths and then secured to the sections 96 and 98 by welding at the spots 102, 103, 104 and 105 if desired to secure the plates 101 to the brackets 96 and 98.

Similarly the chute plates may be composed of three parts consisting of a lower bracket 106 provided with a hinge formation 107 to cooperate with the hinge formation 99 of a tread plate and a common pin, not shown, which bracket 106 is provided with a recess 108. The chute plates may also have an upper section 109 provided with a recessed shoulder 110 and a recess 111. Here too the chute plates 112 may be of different widths depending upon the widths required for the job and then secured to the brackets 106 and 109 by welding at the spots 113, 114, 115 and 116 if desired to secure the plates 112 to the brackets 106 and 109. Of course the plates 101 and 112 may be connected to their respective brackets by other means than welding without departing from the general spirit of the invention.

The exposed faces of the tread plates 15 and 44 are preferably roughened to increase the traction and thus reduce slipping upon these tread plates as much as possible.

Although the material for the device may vary depending upon the use to which the device is to be put, due to lightness of weight and ease of manipulation, excellent results have been achieved when at least the channels 1 and 2, the adjusting angles 3 and 4, and the tread plates 15 and 44 and chute plates 27 are composed of aluminum.

Preferably also the lock pins 83 as shown in Fig. 14 are urged toward the channels 1 and 2 in order automatically to pass into the openings 84 or 86 by the flat springs 117. Each of the flat springs 117 is secured to an actuating plate 69 and is in engagement with the shoulder 118 of the pin 83, with a ring or finger piece 119 extending from the outer side of the spring 117. The pin 83 is slidably mounted in the recess 85 in the plate 69 and then urged into engagement with the intermediate web 71 of the channel 1 or intermediate web 70 of the channel 2 by the springs 117 so that when the plates 69 are actuated into position where the pins 83 register either with the openings 84 or 86 they will slip into the same and anchor the plates 69 in the position defined by the openings 84 or openings 86.

It is obvious that various changes and modifications may be made to the details of construction without departing from the general spirit of the invention as set forth in the appended claims.

It is of course obvious that the fins 18, 24, 20 and 16 may be made integral or separate and subsequently welded or otherwise connected to the tread plates 15 and similarly that the fins or cheek plates 31 and 144 may be made integral with or separate and subsequently welded or otherwise connected to the chute plates 27 without departing from the general spirit of the invention.

It is of course obvious that the combination ladder and chute forming the subject matter of the present invention is adapted for use in ordinary commercial use on land as well as on sea going vessels without departing from the general spirit of the invention.

I claim:

1. A combination ladder and chute comprising a fixed frame, an adjusting frame slidably mounted on said fixed frame, tread plates having front ends and rear ends, pivot pins for pivotally connecting the front ends of said tread plates to said fixed frame and for pivotally connecting the rear ends of said tread plates to said adjusting frame, chute plates, each of said chute plates having a front end and a rear end, a hinge for pivotally connecting the front end of each chute plate to the rear end of one of said tread plates, a slot and pin connection for slidably connecting each chute plate to said adjusting frame, actuating plates operatively connected to said tread plates, and guide means in said fixed frame operatively associated with said actuating plates to enable the actuation of said tread plates in one direction to position said tread plates in ladder forming position and to enable the actuation of said tread plates in another

direction to position said tread plates and chute plates in alinement with one another in chute forming position.

2. The combination as set forth in claim 1 characterized by devices for connecting the upper ends of said fixed frame to a deck or the like, and adjustably connecting means connecting the lower end of said fixed frame at one inclination in ladder forming position and at another inclination in chute forming position.

3. The combination as set forth in claim 1 in which said adjusting frame is disposed under said tread plates and chute plates and within said fixed frame, and in which the actuation of said adjusting frame relative to said fixed frame is downward and into ladder forming position of said tread plates actuating said tread plates into substantially horizontal position and upward into chute forming position, actuating said tread plates and chute plates into alinement with one another.

4. The combination as set forth in claim 1 characterized by an independent tread plate disposed adjacent the upper end of said fixed frame, a roller journalled at the upper free end of said independent tread plate, and a coaming extending above said roller in ladder forming position but clear of said roller in chute forming position.

5. The combination as set forth in claim 1 characterized by guide rails positioned on said fixed frame and extending upwardly from, and along, the sides of said tread plates and chute plates.

6. The combination as set forth in claim 1 characterized by a rod extending through and connecting said fixed frame to said adjusting frame in chute forming position.

7. The combination as set forth in claim 1 characterized by a rod connecting said fixed frame to one of said tread plates in ladder forming position.

8. A combination ladder and chute comprising a fixed frame, an adjusting frame slidably mounted on said fixed frame, tread plates having front ends and rear ends, pivot pins pivotally connecting the front ends of said tread plates to said fixed frame in a row and pivotally connecting the rear ends of said tread plates to said adjusting frame in a row, chute plates, each of said chute plates having a front end and a rear end, a hinge pivotally connecting the front end of each chute plate to the rear end of one of said tread plates, a slot and pin connection slidably connecting each chute plate to said adjusting frame in a row, actuating plates pivotally connected to said fixed frame, arcuate slots in said fixed frame, a rod connecting said actuating plates to said tread plates and extending through said arcuate slots to guide said tread plates and adjusting frame when actuated in one direction to position said tread plates in ladder forming position and in turn when actuated in another direction to position said tread plates and chute plates in alinement with one another in chute forming position.

9. The combination as set forth in claim 8 characterized by means for locking said actuating plates to said fixed frame in either ladder forming position or chute forming position.

10. The combination as set forth in claim 8 in which said fixed frame consists of two channels with the intermediate webs parallel to one another and facing inwardly and in which said tread plates and chute plates are operatively mounted between said channels.

11. The combination as set forth in claim 8 in which said fixed frame consists of two channels having the intermediate webs parallel to one another and facing one another with the tread plates and chute plates operatively mounted between said channels and said actuating plates are operatively mounted on the outer faces of said intermediate webs.

12. The combination as set forth in claim 8 in which said fixed frame consists of two channels having the intermediate webs parallel to one another and facing one another with the tread plates and chute plates operatively mounted between said channels and said actuating plates are operatively mounted on the outer faces of said intermediate webs and in which guide rails are positioned upon the upper edges of said channels and extend upwardly from, and along, the outer edges of said tread plates and chute plates.

13. The combination as set forth in claim 8 in which said fixed frame consists of two channels with the intermediate webs parallel to one another and facing inwardly and in which said tread plates and chute plates are operatively mounted between said channels and in which the front ends of said tread plates are recessed and have shoulders, and in which the rear edge of each chute plate hingedly connected to a tread plate rests on the shoulder of a tread plate in chute forming position.

14. A combination ladder and chute comprising a fixed frame consisting of two spaced channels having intermediate webs parallel with their end webs extending outwardly, an adjusting frame consisting of two angle irons parallel to one another with one pair of their webs in alinement with one another and extending toward one another and the other pair of their webs extending upwardly, said adjusting frame movably mounted between said channels with one angle iron adjacent each of said channels, tread plates having downwardly extending fins at their sides and traction surfaces facing outwardly, pivot pins pivotally connecting the front ends of the downwardly extending fins of said tread plates to the intermediate webs of said channels and pivotally connecting the rear ends of said fins to the upwardly extending webs of said angle irons, chute plates having downwardly extending fins, each of said chute plates having a front end and a rear end, a hinge pivotally connecting the front end of each chute plate to the rear end of one of said tread plates, slot and pin connections slidably connecting the fins of each chute plate to the upwardly extending webs of said angle irons, actuating plates pivotally connected to the intermediate webs of said channels, arcuate slots in said intermediate webs in alinement with one another, a rod connecting said actuating plates to one another extending through said arcuate slots as guides and connected to the fins of said tread plates, and handles on said actuating plates for manipulating said actuating plates in turn to actuate said tread plates into substantially horizontal position in ladder forming position and in turn actuating said tread plates and chute plates into alinement with one another in chute forming position.

15. The combination as set forth in claim 14 characterized by recesses in said intermediate webs, and spring loaded pins mounted on said actuating plates and entering said recesses to anchor said actuating plates and therewith said tread plates and chute plates in ladder forming position and in chute forming position.

16. The combination as set forth in claim 14 characterized by a rod extending through said intermediate webs into the tread plate fins to lock said tread plates in ladder forming position and into upwardly extending webs in chute forming position.

17. The combination as set forth in claim 14 characterized by an independent tread plate having downwardly extending fins pivotally connected to said channels and said angle irons, brackets at the rear end of said tread plate, a roller journalled in said brackets, and a coaming extending above said roller in ladder forming position but clear of said roller in chute forming position.

18. The combination as set forth in claim 14 characterized by devices connecting the upper ends of the intermediate webs of said channels to an upper deck or the like, devices connecting the lower end of the intermediate webs of said channels to a lower deck or the like in ladder forming position, and adjustable connecting means connecting the lower ends of the intermediate webs of said channels to a lower deck or the like in chute forming position.

19. A combination ladder and chute comprising a fixed frame, an adjusting frame slidably mounted on said fixed frame, tread plates having front ends and rear ends, pivot pins pivotally connecting the front ends of said tread plates to said fixed frame and pivotally connecting the rear ends of said tread plates to said adjusting frame, chute plates, each of said chute plates having a front end and a rear end, a hinge pivotally connecting the rear end of each chute plate to the rear end of one of said tread plates, a slot and pin connection slidably connecting each chute plate to said adjusting frame, means for actuating said tread plates and chute plates relative to said fixed frame into ladder forming position or chute forming position, and a separate plate section having a traction face connecting the front and rear ends of each tread plate to

one another and a separate plate section connecting the front and rear end of each chute plate to one another.

20. The combination as set forth in claim 19 in which the plate sections of said tread plates and the plate sections of said chute plates are welded to their respective front and rear ends.

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