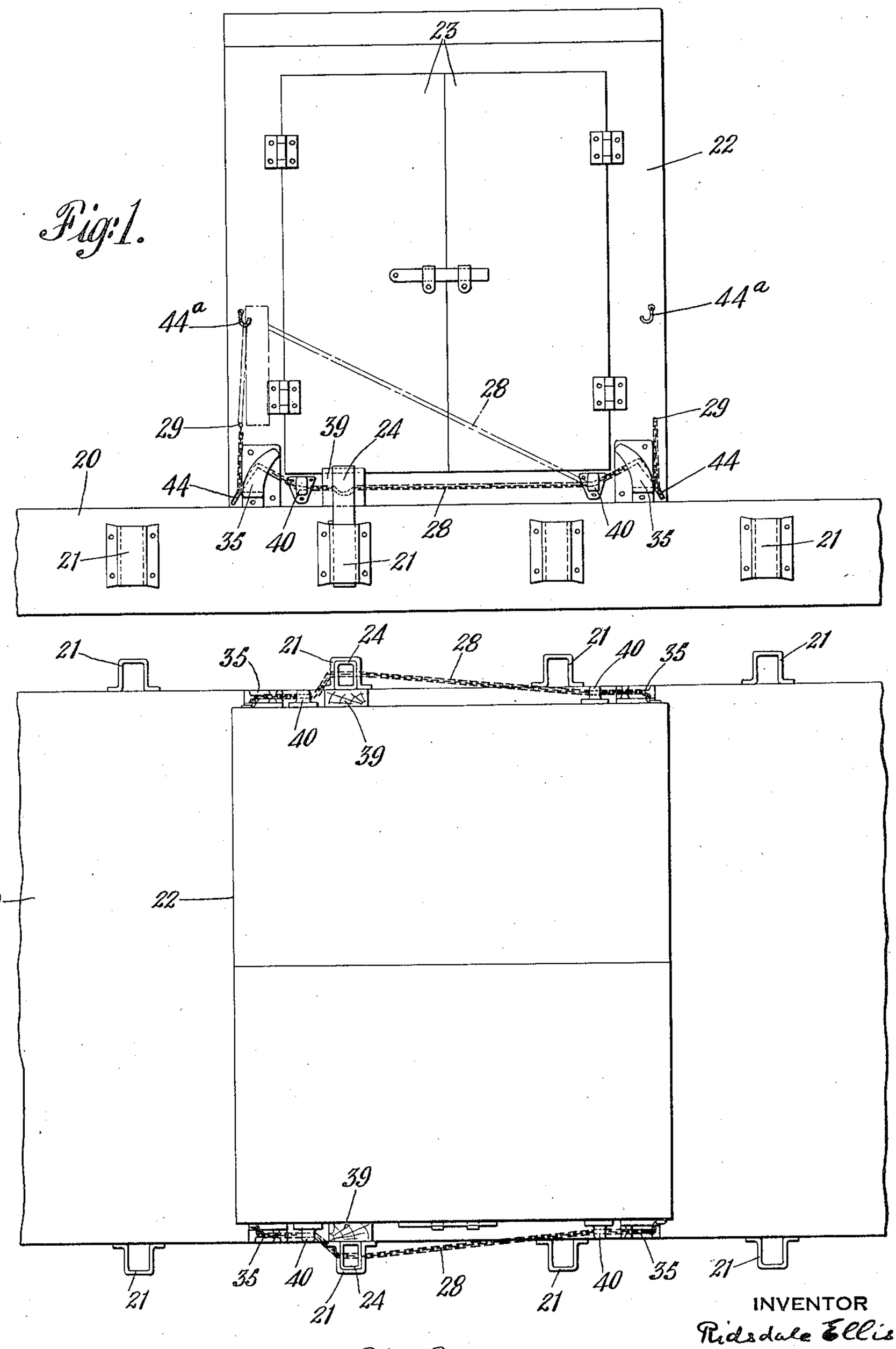
Aug. 20, 1935. R. ELLIS 2,012,040

FASTENING DEVICE

Filed Aug. 9, 1933 4 Sheets-Sheet 1.

Fig: 1.



INVENTOR
Ridsdale Ellis

Fig: 2.

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Fig: 3.

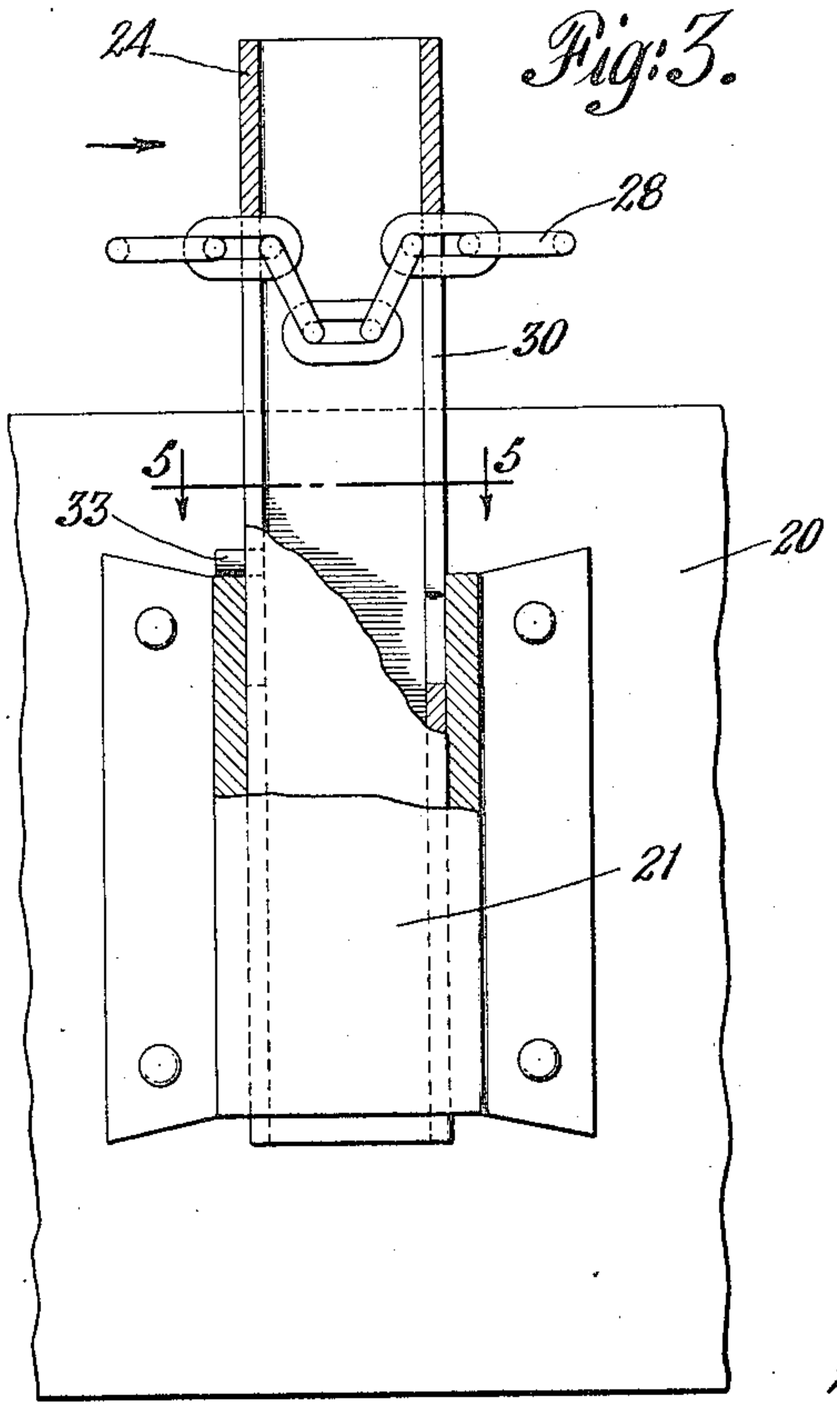

Fig: 4.

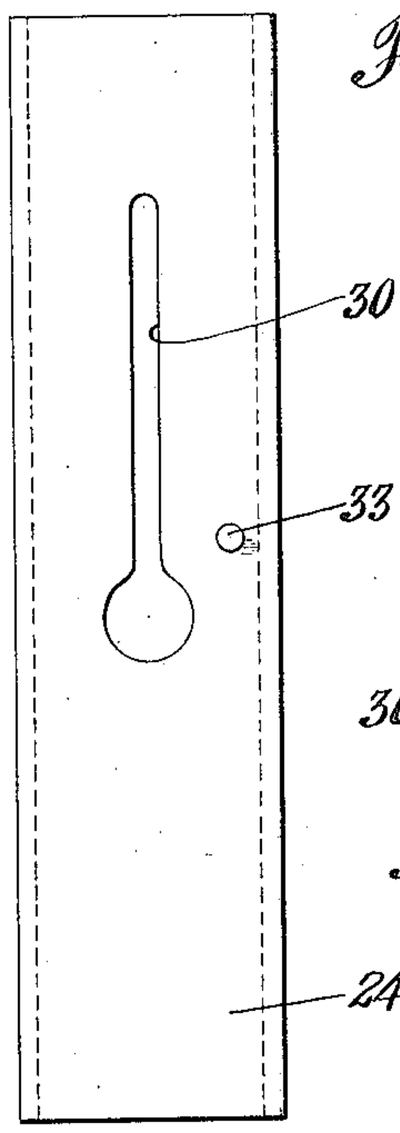

Fig: 5.

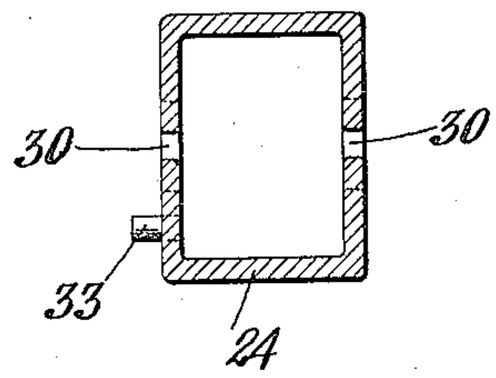

Fig: 6.

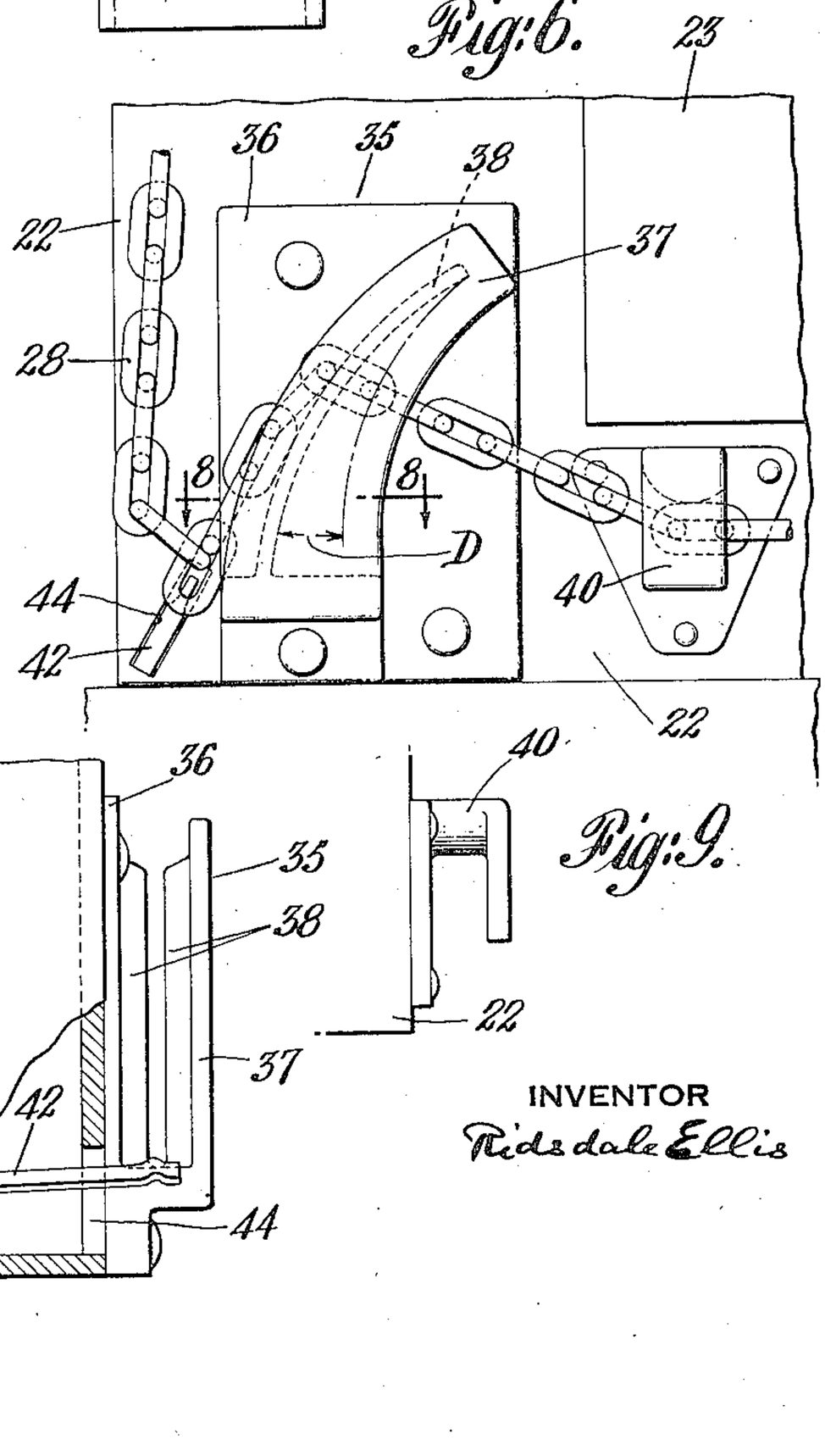

Fig: 8.

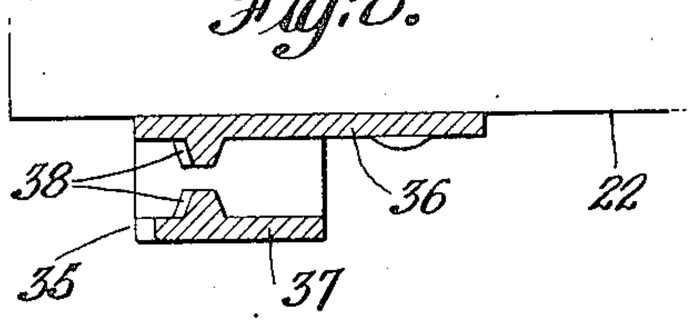

Fig: 7.

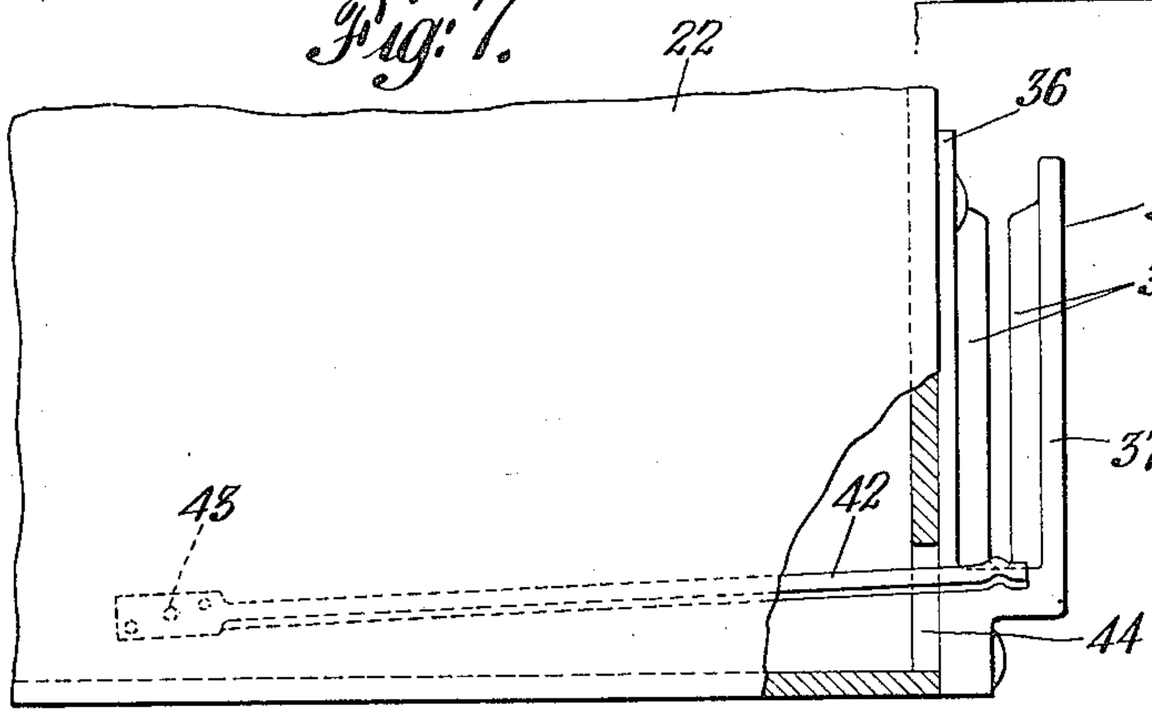

Fig: 9.

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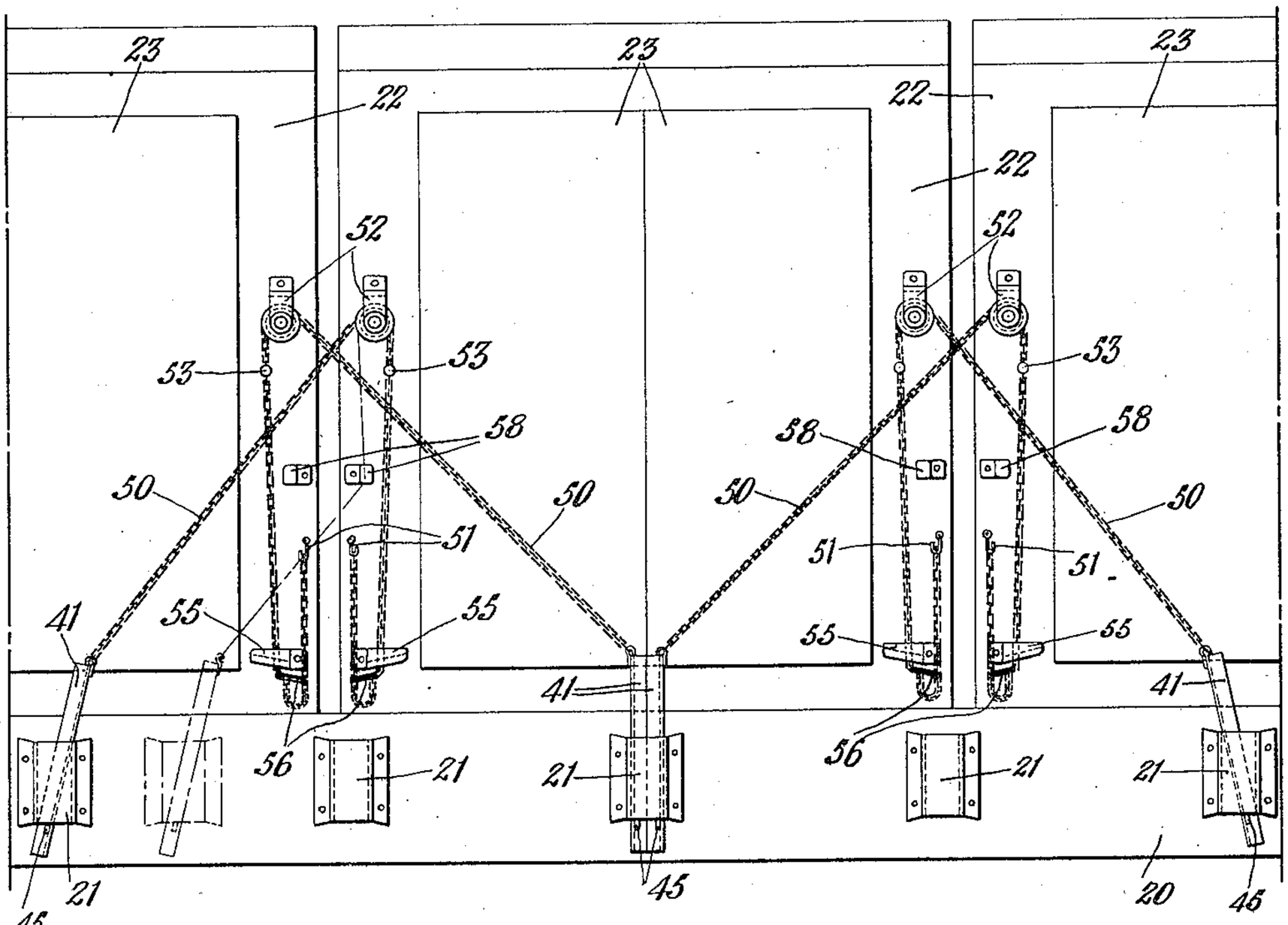

Fig:10.

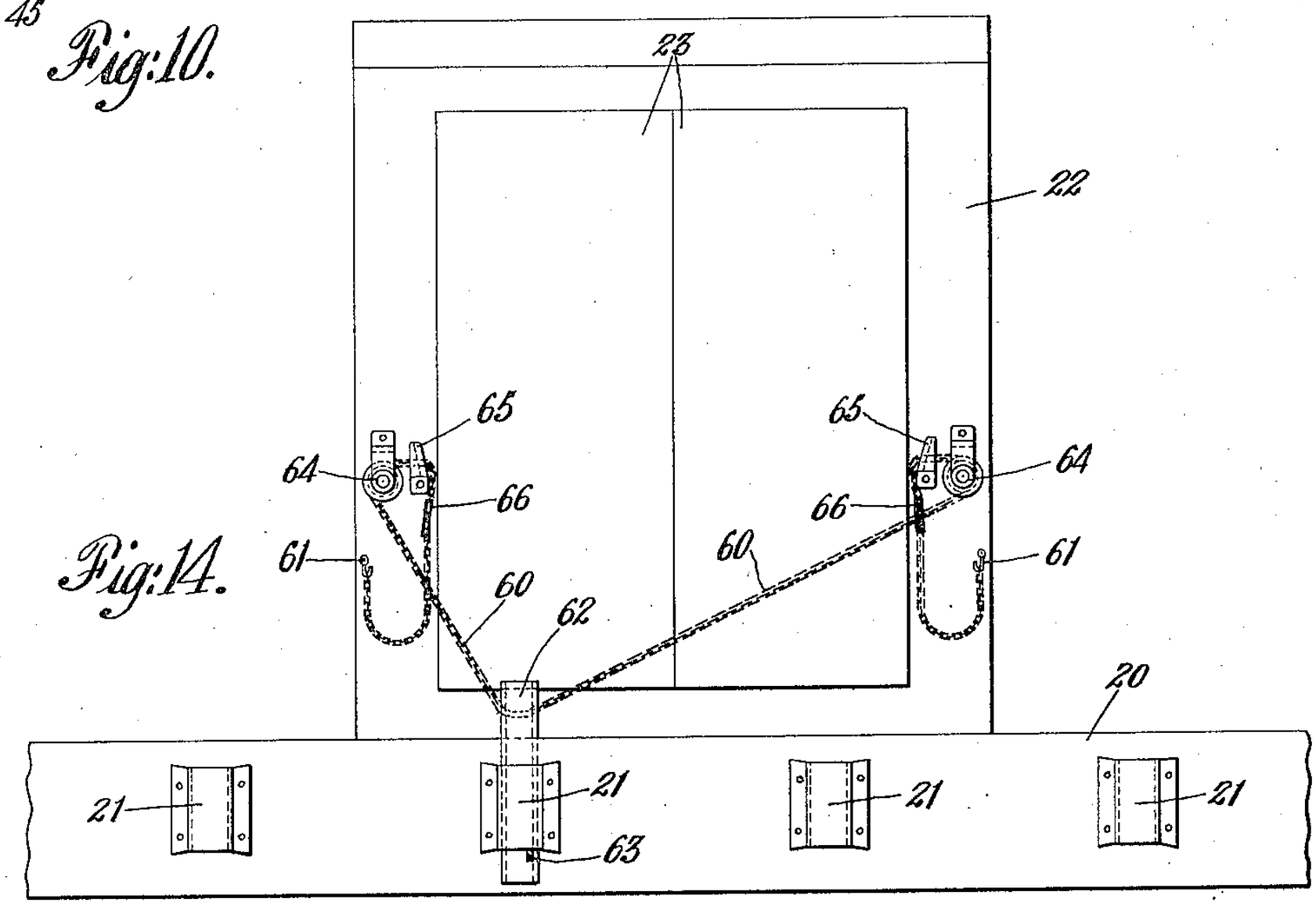

Fig:14.

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Rideadale Ellis

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Fig:11.

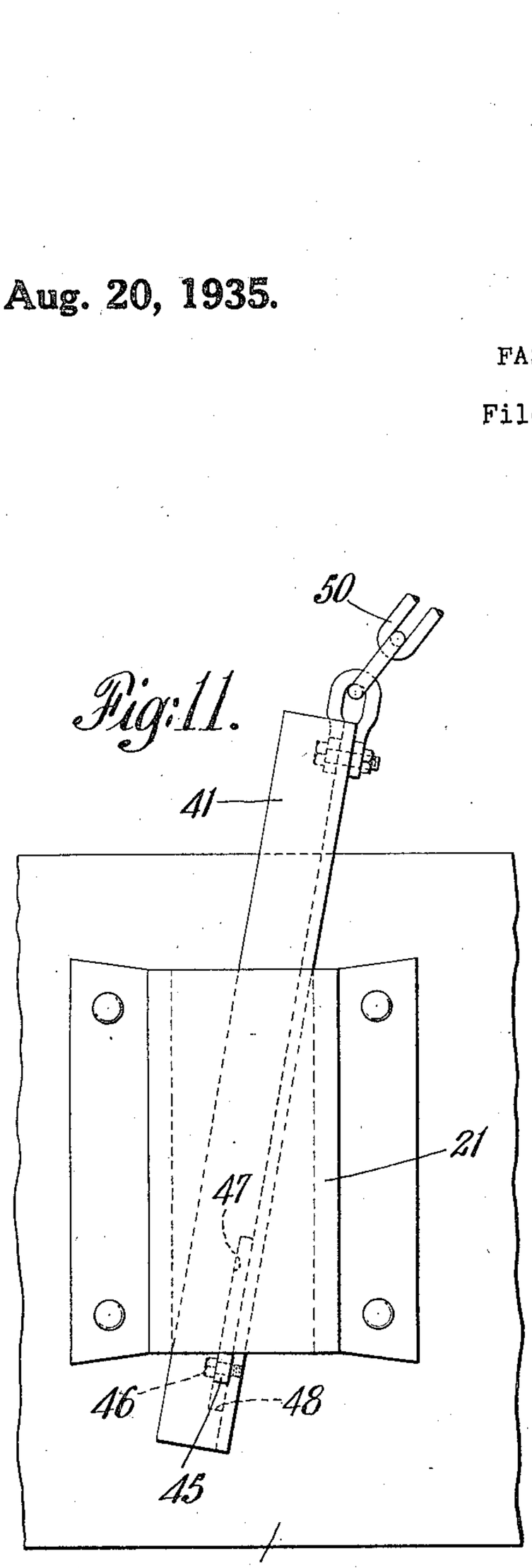


Fig:12.

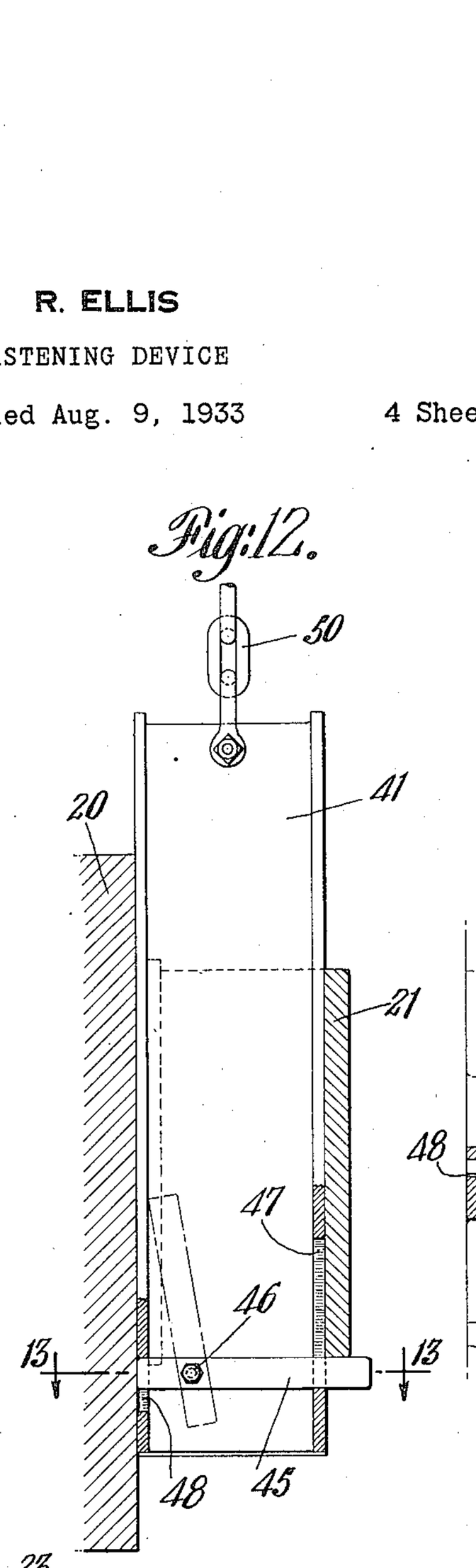


Fig:13.

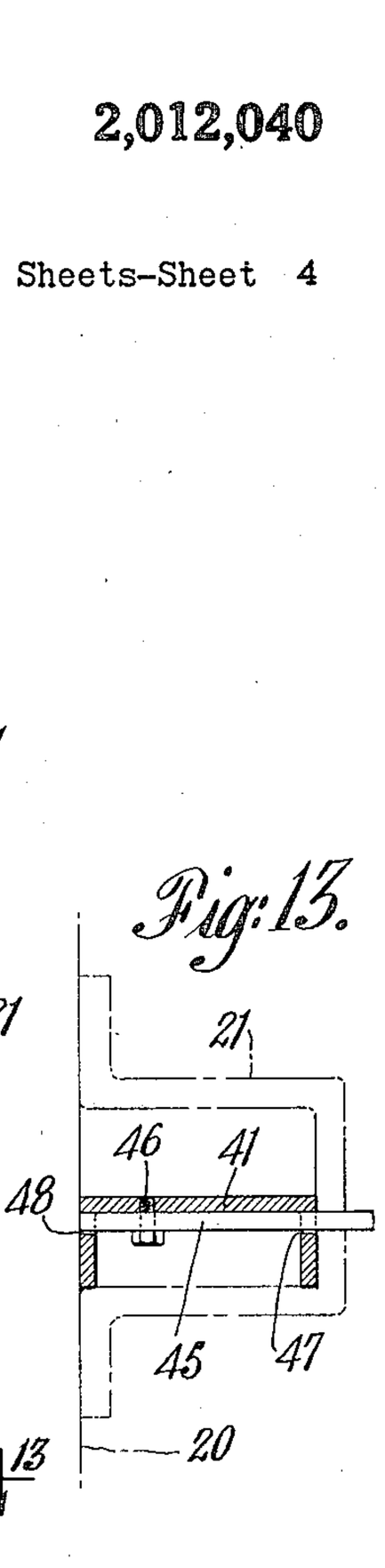
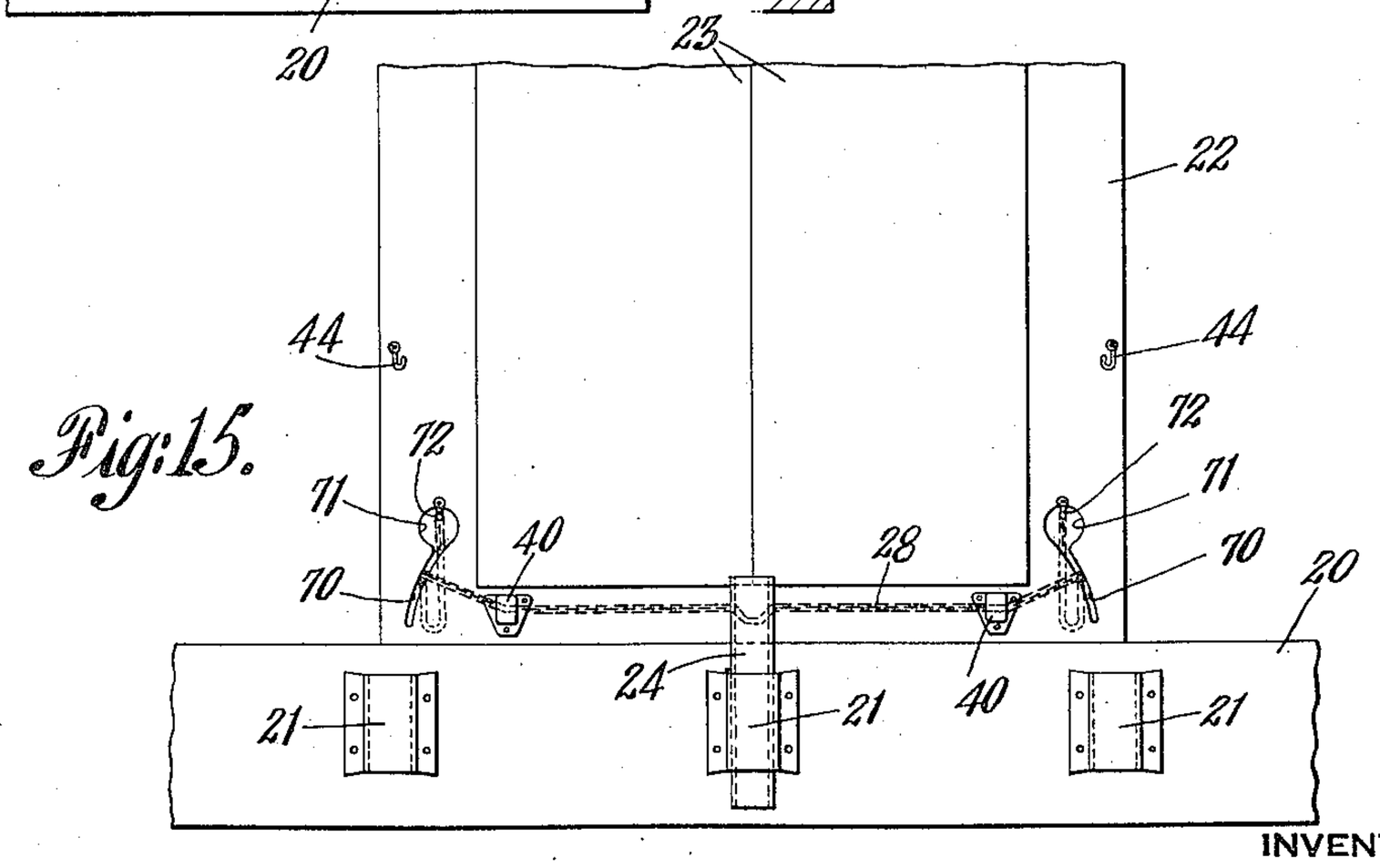


Fig:15.



INVENTOR

Rideale Ellis

Patented Aug. 20, 1935 2,012,040

UNITED STATES PATENT OFFICE

2,012,040

FASTENING DEVICE

Ridsdale Ellis, New York, N. Y.

Application August 9, 1933, Serial No. 684,354

12 Claims. (Cl. 280—179)

This invention relates to fastening devices for securing articles, such as less-than-car-load containers, to vehicles, especially railroad flat cars.

Railroad containers are usually carried on specially constructed cars having sides, ends and intermediate partitions forming a series of compartments adapted to receive containers of complementary dimensions. The interfitting relationship between the containers and container cars makes interchangeability almost impossible.

A flat car is in many ways an ideal carrier for containers. Such cars are to be found almost everywhere and, further, as there are no parts to be brought into interfitting relation with the containers, they are adapted to carry substantially any make of container. The difficulty, heretofore, has been the trouble and expense of securing container on the flat car.

The principal object, therefore, of the present invention is to provide cheap, simple and easily operated fastening devices for securing articles such as less-than-car-load containers on vehicles such as railroad flat cars.

A further object of the invention is to provide fastening means constructed so that the load-retaining chains or the like can be drawn taut without the use of turnbuckles or other devices having sliding surfaces liable to rust up and freeze together.

According to the present invention, loads like railroad containers are secured to flat cars by universally movable members, usually chains, connected to stakes or the like in the stake pockets of the car and also to the load. Where the invention is applied to containers, each of the four corners of each container is connected by such a member to a stake. These members extend from the containers to the stakes in a vertical plane which is roughly or substantially parallel to the side sills of the flat car. By roughly or substantially parallel is meant a direction considerably nearer parallel than perpendicular to the side sills. They are, therefore, well adapted to prevent longitudinal movement of the container with respect to the car. However, they are not so well adapted to prevent transverse movement of the container with respect to the car. If, however, a stake is arranged opposite each end of the container, the latter cannot move laterally beyond the stake line. If it is desired positively to prevent lateral movement of the container that can be done by inserting a wooden block or wedge between the stake and the adjacent end of the container.

The invention includes the provision of special forms of stakes as well as means for connecting the stakes to the corners of the container in such a way that it is securely braced against movement longitudinally of the flat car. These connecting means are usually chains and the invention comprises means for adjusting the points of operative connection between the chains and the corners of the containers and for the stakes in such a way that, irrespective of the relative positions of the containers and the stake pockets, the chains may be drawn taut and held taut while the flat car is in transit. This provision for adjustability is necessary for the reason that the ordinary flat cars now in use vary in length, width and in the spacing of the stake pockets.

Various forms of the invention are illustrated by way of example in the accompanying drawings, wherein:

Fig. 1 is a side elevation of the side-sill of a flat car with a container secured thereto by a fastening device constructed in accordance with the present invention;

Fig. 2 is a plan view of the same;

Fig. 3 is a side elevation on an enlarged scale of the stake and its stake pocket, partly in section, shown in Fig. 1;

Fig. 4 is an end elevation of the stake alone, taken in the direction of the arrow in Fig. 3;

Fig. 5 is a section through the stake on the line 5—5 of the Fig. 3;

Fig. 6 is a side elevation on an enlarged scale of the chain hook and adjacent parts of the container;

Fig. 7 is an end elevation of the same, partly in section;

Fig. 8 is a section on the line 8—8 of Fig. 6;

Fig. 9 is an end elevation of the chain guide shown in Fig. 6;

Fig. 10 is a side elevation of the side sill of a flat car with a container secured thereto with modified form of fastening device;

Fig. 11 is a side elevation on an enlarged scale of the stake and its stake pocket, shown in Fig. 10;

Fig. 12 is an end elevation of the same, partly in section;

Fig. 13 is a section on the line 13—13 of Fig. 12;

Fig. 14 is a side elevation of the side sill of a flat car with a container secured thereto with another form of fastening device; and

Fig. 15 is a side elevation of a side sill of a flat car with a container secured thereto with a still further form of fastening device.

Referring to the form of construction shown in Figs. 1 to 9 inclusive, 20 represents the floor of a flat car provided with the usual stake pockets

21. On top of the flat car is a less-than-carload container 22 provided with doors 23.

While, as previously pointed out, flat cars vary in length, height and width and in the spacing of the stake pockets along the side sills, the individual stake pockets are practically universally of standard size, viz. 4'' x 5'', the long dimension being transversely of the car. Consequently the containers may be fitted with standard sized stakes such as 24 which will properly fit a stake pocket on any flat car.

While in Figs. 1 and 2 only one container is shown, usually there will be 5 or 6 of them extending in a row along the top of the flat car. As the spacing of the stake pockets on different flat cars varies, it follows that there can be no definite invariable position of the container relatively to the stakes. Similarly as the width of the flat cars vary, there will be spaces of varying width between the stakes and the adjacent sides of the containers.

To permit the containers to be connected to the stakes regardless of the positions of the latter with respect to the containers, chains 28, or other flexible or universally movable connecting members are used. These chains are secured to the containers adjacent their corners and also to the stakes in such a way that the length of the chain between the points of attachment to the container and stake may be adjusted.

In the form of construction shown in Figs. 1 to 9, inclusive, a single chain 28 is used at each side of the container secured at its ends by shackles 29 to the corners of the container.

On each chain is threaded a stake 24 in such a way that the position of the stake may be adjusting therealong. As shown, the stake is formed of a short length of rectangular steel tube or a similarly shaped malleable casting in which two key-hole slots 30 are formed in register with each other. The lower end of the slot is enlarged sufficiently to permit free passage of the chain, while the upper end has a width only slightly greater than the diameter of the material of which the chain is made. The upper ends of the slots are, therefore, each adapted to receive one link of the chain flat-wise as shown in Fig. 3 and the chain is positively prevented from moving by the engagement of the adjoining links with the inner walls of the stake on either side of the slots. The stake has a pin 33 on one side adapted to engage the rim of the stake-pocket and hold the stake in the position shown in Fig. 3. When the stake is in that position the enlarged ends of the slots are inside the stake pocket so that, should the chain be permitted to drop, it will not be released from its interlocking relation with respect to the stake.

The slot in the stake, to advantage, extends as shown above the floor of the flat car so that the chain when pulled taut will be clear of the wooden floor of the flat car.

The ability to adjust the stake along the chain avoids the necessity of two chains each long enough to permit wide variations in the position of the stake with respect to the container. It is desirable to avoid long chains to save weight where no special advantage is derived from such length. Further, whether the chains are long or short, they should be hung from the container in such a way that when one of the chains and a stake attached thereto hang down, it cannot reach the rail and catch in a rail point or crossing. Long chains with individual stakes secured to their ends are shown in a further form of the invention to secure special advantages as will be explained later.

In the form shown in Figs. 1 to 9 the chain and stake are prevented from dropping much below the car sill when the stake is not in a stake pocket by connecting the two ends of the chain to the corners of the container and adjusting the position of the stake therealong.

In addition to such adjustability of the stake with respect to the chain, it is desirable to provide means for drawing the chain taut on either side of the stake, although such means are not an essential feature of the invention. In some cases a simple hook may be sufficient, but such a hook provides only for adjustment to the extent of the length of a link or multiples thereof, not any intermediate fraction.

To enable the chain to be adjusted to any length and hence to be drawn taut, a modified form of chain hook is used. This hook designated generally as 35, is shown in detail in Figs. 6, 7, and 8. It consists of two parts 36 and 37 spaced apart the width of a link of the chain and connected at the bottom so as to form a parallel-sided fork adapted to receive the chain. On the inner faces of the parts 36 and 37 are oppositely arranged inwardly extending ribs 38, spaced apart wide enough to permit the passage of a link of the chain flatwise while preventing the passage of either of the two other links connected thereto, as shown in Fig. 6. It is the link to the left of the link passing between the ribs which is in operative engagement with the hook. The section of chain leading from one side of the stake may be pulled taut by hand and the link nearest the ends of the ribs 38 slid therebetween. This provides, as in the case of the slot in the stake, an adjustment of the length of a link or any multiple thereof but not any fraction thereof. To provide for fractional adjustment the ribs are made of considerable length and arranged so that as a link slides down between the ribs, the distance between the link to the left (Fig. 6) of such link and the stake steadily increases until that section of the chain is drawn taut. In other words a wedging action is obtained. From inspection of Fig. 6 it will be seen that if the chain extended to the chain hook in a horizontal direction the angle of the wedge formed by the upper parts of the ribs 38 would be so steep that the chain would pull off. On the other hand, if the chain extended upwardly to the chain hook at an angle of say 60° to the horizontal, a negative wedging action would result, i. e. as the chain dropped between the ribs it would become looser instead of tighter. Hence, while not always essential, it is preferable to provide a guide, such as 40, for the chain to insure that the latter always extends towards the chain hook at the proper angle.

The distance D in Fig. 6 represents the distance the ribs 38 deviate from the arc through which the chain would normally swing about its guide 40. If this distance D is in excess of the length of one link then, by first selecting the proper link to insert between the ribs 38, and second sliding such link downwardly the chain may always be drawn taut. A direct pull on the chain as the result of movement of the container cannot loosen the chain as the wedging angle is too small. The only forces which can cause the chain to move upwardly in the chain hook and loosen the chain are those acting in a direction substantially parallel to the ribs 38 of the hook. Jolts and jerks of the flat car may provide such forces but they are relatively very slight in magnitude and conse-

quently easily counteracted. A spring acting on the portion of the chain on the left side (Fig. 6) of the chain hook so as to draw the chain downwardly in a direction substantially parallel to the ribs 38 will effectively prevent any accidental disengagement of the chain from its hook and, further, will automatically tighten the chain. A simple but effective form of spring for this purpose is a flexible steel strip 42 attached to the inner wall of one side of the container at 43 and extending outwards through a slot 44 in the front of the container. The end of the spring is curved (see Fig. 7) so as to hold it in engagement with any link of the chain with which it may be engaged.

To retain the containers in place laterally wooden blocks or wedges 39 may be inserted between the stakes 24 and the adjacent sides of the container.

When the stakes 24 are not in use they may be hung (as indicated in dotted lines in Fig. 1) on one or other of the hooks 44A inserted into the slots 30 in the stakes.

In the construction of Figs. 1 to 9, the container is held in position by a single pair of stake pockets. For greater security each container may be anchored to two pairs of stake pockets by 4 stakes. A construction adapted to permit anchoring by four stakes is shown in Figs. 10 to 13 inclusive.

The average width of a container (measured lengthwise of the flat car) is about equal to the distance between every other stake pocket. Hence, when one of the stake pockets is opposite the center of the container the pockets on either side are opposite the corners of the container to which the chains are connected, in which position they are practically useless for the purpose of restraining longitudinal movement of the container, as the direction of the chains would be substantially vertical instead of being more or less horizontal. Under these conditions the only stake-pockets which can be used effectively when the chains are connected to the corners of the container are the ones opposite the middle of the container and the two pairs opposite the centers of the two adjacent containers. This means that the chains either converge inwards to a single stake pocket (Fig. 1) or diverge outwards to two stake pockets (Fig. 10). The latter arrangement involves four separate chains and four separate stakes and, when a battery of containers is loaded on a flat car, it requires stakes constructed so that either one or two stakes may be inserted in any stake pocket and still operate satisfactorily.

A stake 41 complying with these requirements is shown in Figs. 11, 12, and 13. It consists of a shallow channel 5'' x 2'' so that two of them may be inserted in the usual 5'' x 4'' stake pockets, as shown at the center of Fig. 10. If, however, only one stake is inserted in a stake pocket the stake fits the pocket in a direction transverse with respect to the flat car (the direction in which the stake acts in restraining lateral movement of the container with the aid of a wood filler block if necessary), and rests under the tension of its chain in an inclined position against the upper and lower side margins of the stake pocket.

In Figs. 1 to 9 inclusive the chain on either side of the stake is substantially horizontal so that the stake should be restrained from dropping through its pocket instead of from pulling out. In Figs. 10 to 13 inclusive the chains extend upwardly from the stakes at a very considerable angle so that means must be provided for preventing the stakes pulling out of their pockets.

Various stake retaining means may be used. One simple form consists of a bar or latch 45 loosely pivoted at 46 off-center with respect to the stake. Slots 47 and 48 are cut in the flanges of the stake so that the bar may be moved from the full to the dotted line position shown in Fig. 12. When it is desired to insert the stake in a pocket the bar is put in the dotted line position where it is held by gravity owing to the off-center position of its pivot. The stake can then be dropped through the pocket with its flanges parallel to the side of the flat-car. Next the bar is moved into the full line position so that when the stake is drawn upwards by its chain the projecting end of the bar will engage the outer part of the stake pocket. It will be noted that the pressure on the bar due to engagement with the stake pocket is carried by the shoulders formed by the bottom and top of the slots 47 and 48, respectively instead of by the pivot which is made loose for that purpose.

Each chain 50 is connected at one end to the upper end of a stake 41 and at the other end to the front of the container at 51. Intermediate these points of connection the chain passes around a housed sheave 52 well up on the side of the container. A stop or enlargement 53 is provided on the chain to limit the distance the chain may pass through the sheave and so prevent the end of the stake when hanging free reaching down to the level of the rails. Each chain is provided with a chain hook 55 having a wedge action like that of the chain hook 35 and a spring 56 for holding the chain in engagement with its hook. The chain hook is desirably placed as shown near the bottom of the container so that it may be reached by a man standing on the ground alongside of the flat car on which the container is to be secured.

Desirably the angle of the chains should be around 45° to the horizontal and less, rather than more, as the movement to be restrained is horizontal rather than vertical. Hence, in order to provide for a case where a stake pocket is in a position, such as indicated in Fig. 10, where the normal pull of the chain or the stake would be at an angle of 60° or more, one or more chain guides 58 are desirably provided around which the chain may be looped as shown in dotted lines in Fig. 10.

While one of the chief reasons for inclining the chains as shown in Fig. 10, is to raise the point of operative connection of the chain to the container (i. e. the sheave) so that under no circumstances can the stake reach the rail level. This inclined arrangement has the advantage that it prevents the tilting of the container vertically.

Chains horizontally arranged, as in Fig. 1, have little or no restraining action against tilting. A modification of the construction shown in Fig. 1, adapted to restrain tilting, is illustrated in Fig. 14. In this case the chain 60 is connected at its ends at 61 to the container and has threaded thereon a stake 62 constructed as shown in Figs. 3, 4 and 5 except that the pin 33 is replaced by a latch bar 63 constructed like the latch bar 45 of Figs. 11, 12, and 13. Sheaves 64, chain hooks 65 and springs 66 are provided to enable the chain to be drawn taut on either side of the stake.

A still further modification of the arrangement, shown in Fig. 1, is illustrated in Fig. 15, in which construction the chain hooks are replaced by

curved slots 70 in the front wall of the container. The ends of the chain are shackled at 72 to the upper margins of the enlarged upper ends 71 of the slots 70 so that the portions of the chain between the shackles 72 and the link passing through the slot are retained in a pocket (not shown) inside the container.

It will be evident that the improved forms of stake described herein could be employed in the anchoring of chains used to hold articles of all kinds to flat cars, such as loads of lumber, farm machinery and so forth.

Further the chain hook could be placed on the side sills of a flat car or on a truck as a means for securing and drawing taut a chain used to secure articles on the flat car or truck.

The term container is used to include not only the steel containers commonly referred to merely as containers but also crates such as are used for the transportation of automobiles, tanks for the transportation of oil, milk, etc., and other similar receptacles for goods.

I claim:

1. The combination of a container and means for releasably securing the same to a railroad flat car comprising a chain, means for releasably securing the chain to the container selectively at a plurality of points along the chain and permanently connected at points to the container near the corners of the latter, and a stake adapted to engage a stake pocket and operatively connected to the chain at a point intermediate the points at which the chain is secured to the container.

2. The combination of a container and means for releasably securing the same to a railroad flat car comprising a chain, means for operatively connecting the chain to the container at points near the corners of the latter and a stake adapted to engage a stake pocket and adapted to be releasably locked to the chain selectively at a plurality of points therealong intermediate the points at which the chain is secured to the container to allow the container to be secured to the flat car at any position therealong with respect to the stake pockets of the flat car.

3. The combination of a container and means for releasably securing the same to a railroad flat car comprising a chain connected at its ends to the container near the ends of the latter, a stake adapted to fit the stake pocket of a flat car, and formed with a slot therethrough of inverted keyhole shape, the enlarged lower end of the slot being large enough to permit free passage of the chain, while the upper end is narrower than the width of the links of the chain and wider than the diameter of material of which the chain is made, so that when the chain passes through the lower part of the slot the position of the stake relatively to the chain may be adjusted and when the chain passes through the upper part of the slot the chain and stake are releasably locked in such adjusted position, to aid in securing the container to the flat car at any position therealong with respect to the stake pockets of the flat car.

4. The combination of a container and means for releasably securing the same to a railroad flat-car comprising a chain, means for securing the chain to a portion of the flat-car and means for securing another section of the chain to the container including a chain hook having chain engaging surfaces inclined with respect to the axis of that part of the chain which extends between said two means, whereby by sliding the link of the chain which is in engagement with said surfaces, said part of the chain may be drawn taut to positively prevent movement of the container with respect to the flat-car in a direction parallel to said part of the chain.

5. The combination of a container and means for releasably securing the same to a railroad flat car comprising a tension member, means secured to said member for anchoring it to a railroad flat car, and means for securing the member to the container comprising a wedge-shaped part attached to the container, whereby movement of the tension member relatively to said part causes the tension member to be drawn taut.

6. The combination of a container and means for releasably securing the same to a railroad flat car comprising a tension member, means secured to said tension member for anchoring it to a railroad flat car, means for securing the member to the container comprising a wedge-shaped part attached to the container, whereby movement of the tension member relatively to said part causes the tension member to be drawn taut, and a spring acting on said member in a direction tending to move the latter relatively to the wedge-shaped part so as to maintain the tension in said member.

7. The combination of a container and means for releasably securing the same to a railroad flat car comprising a chain, means secured to the chain whereby one part thereof may be connected to a railroad flat car and a chain hook on the container having chain engaging surfaces making an obtuse angle with respect to the axis of the chain adjacent the chain hook, whereby sliding the part of the chain in engagement with said surfaces therealong causes that part of the chain between the hook and the flat car to be drawn taut.

8. The combination of a container and means for releasably securing the same to a railroad flat car comprising a chain, connected at one end to the container, means attached to the other end of the chain for connecting it to a portion of the flat car, a chain hook on the container adapted to engage the chain at a plurality of points intermediate its ends and thereby provide for adjustment in the length of the chain to within the length of a link thereof, said chain hook having chain engaging surfaces making an obtuse angle with respect to the axis of the chain adjacent the chain hook, whereby sliding the link of the chain in engagement with said surfaces therealong causes that part of the chain between the hook and the flat car to be drawn taut.

9. The combination of a container and means for releasably securing the same to a railroad flat car comprising a chain, means secured to the chain whereby one part thereof may be connected to a railroad flat car, a chain hook on the container having chain engaging surfaces making an obtuse angle with respect to the axis of the chain adjacent the chain hook, whereby sliding the part of the chain in engagement with said surfaces therealong causes that part of the chain between the hook and the flat car to be drawn taut, and a spring acting on the part of the chain on the opposite side of the hook to prevent unintentional disengagement of the chain and hook.

10. The combination of a container and means for releasably securing the same to a railroad flat car comprising a chain connected at one end to the container, means attached to the other end of the chain for connecting it to a portion of the

flat car, a chain hook on the container adapted to engage the chain at a plurality of points intermediate its ends and thereby provide for adjustment in the length of the chain to within the length of a link thereof, a chain guide intermediate said means and said chain hook, said chain hook having chain engaging surfaces making an obtuse angle with respect to the axis of that part of the chain which extends from the guide to the chain hook whereby sliding the link of the chain in engagement with said surfaces from the open end of the hook towards the closed end causes that part of the chain between the hook and the flat car to be drawn taut.

11. The combination of a container and means for releasably securing the same to a railroad flat-car having stake-pockets, comprising tension anchoring means, means for engaging both a stake-pocket and said anchoring means, means on the container for engaging said anchoring means, the engagement of said anchoring means with one of the two other means being selective at a plurality of spaced points along the anchoring means to compensate for variations in the position of the container relative to said stake-pocket, one of said means including a wedge-shaped part for sliding engagement with a portion of the anchoring means for taking up the slack in said anchoring means after said selective engagement has been made.

12. The combination of a container and means for releasably securing the same to a railroad flat-car having stake-pockets, comprising tension anchoring means permanently connected to the container, means for engaging both a stake-pocket and said anchoring means, means on the container for engaging said anchoring means, the engagement of said anchoring means with one of the two other means being selective at a plurality of spaced points along the anchoring means to compensate for variations in the position of the container relative to said stake-pocket, one of said means including a wedge-shaped part for sliding engagement with a portion of the anchoring means for taking up the slack in said anchoring means after said selective engagement has been made.

RIDSDALE ELLIS.