Sept. 16, 1952 M. A. ENGLISH ET AL 2,610,743

HOISTING MECHANISM

Filed July 18, 1949 3 Sheets-Sheet 1

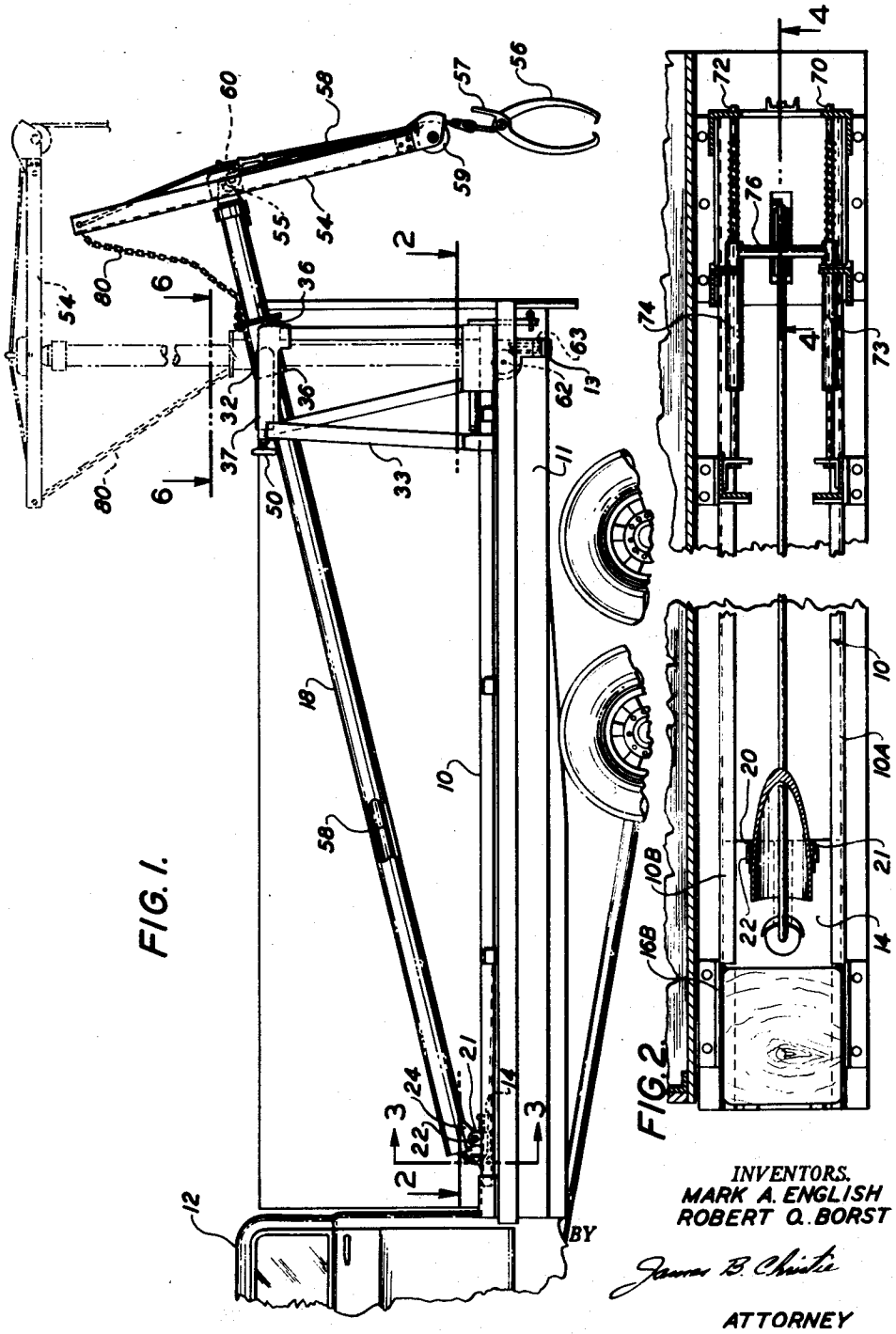


FIG. 1.

FIG. 2.

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Filed July 18, 1949 3 Sheets-Sheet 2

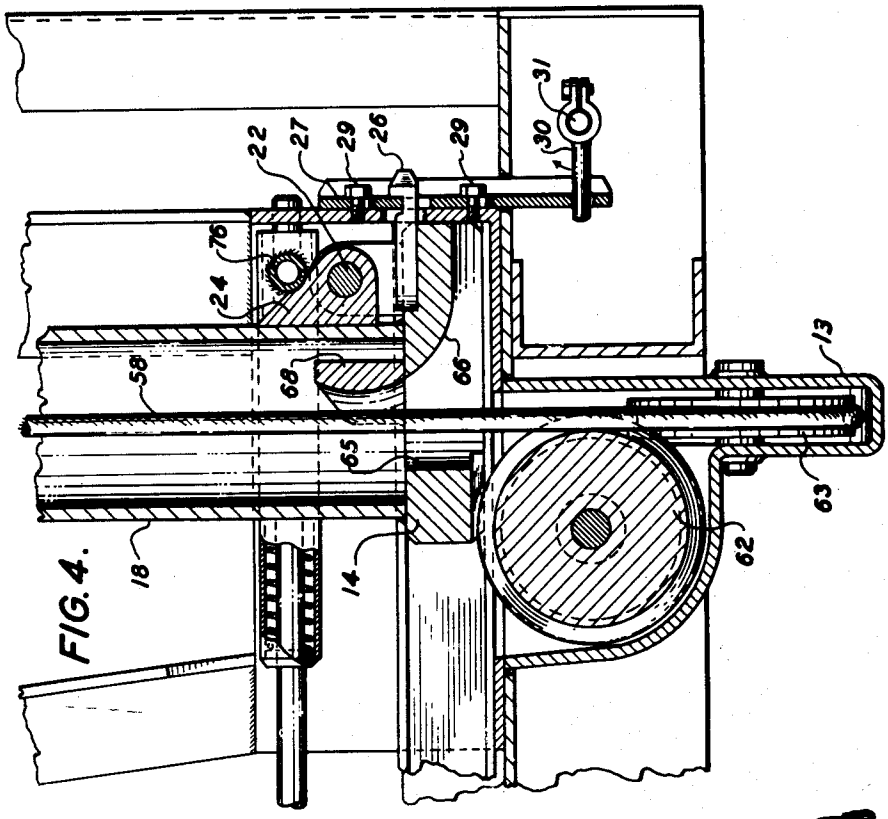


FIG. 4.

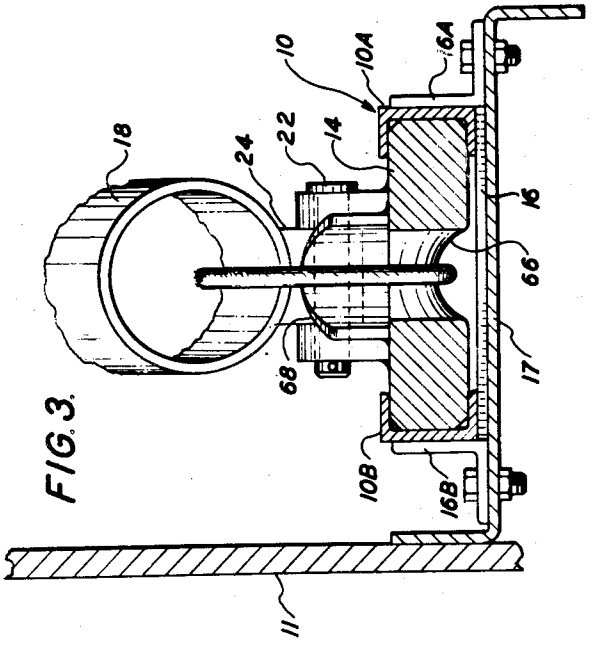


FIG. 3.

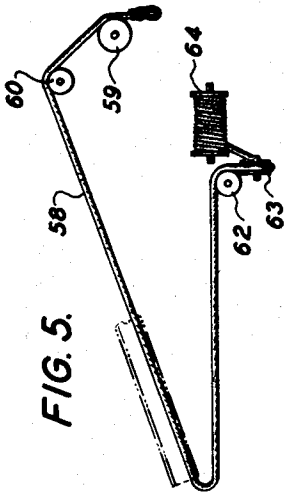


FIG. 5.

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HOISTING MECHANISM

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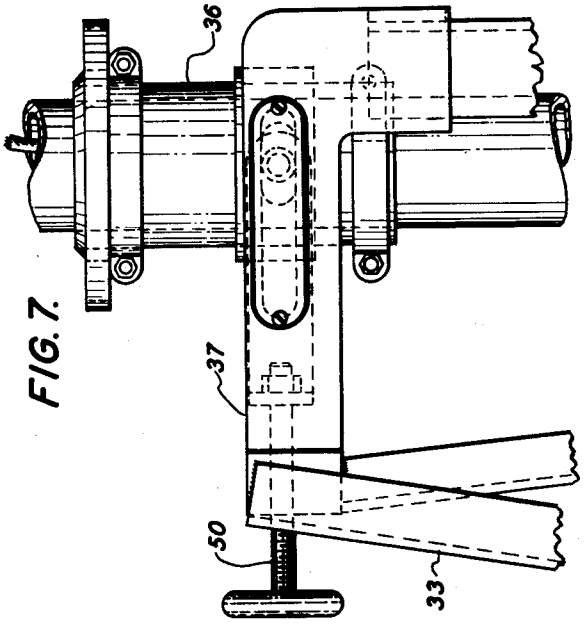


FIG. 7.

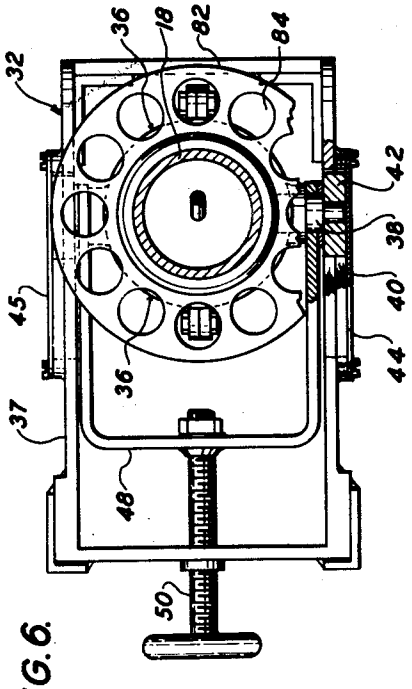


FIG. 6.

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HOISTING MECHANISM

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6 Claims. (Cl. 212—9)

1

This invention relates to a hoisting mechanism and particularly to a truck-mounted hoist.

In a preferred form the invention contemplates a truck mounted hoist adapted to raise ice from the truck to the top of a refrigerated car. In the icing of refrigerator cars of conventional design it is necessary to lift the ice to the top of the car. In many cases the ice is delivered to the cars by truck. It has been proposed heretofore to mounting a suitable hoisting means on the truck itself whereby the ice may be conveyed to the top of the refrigerator car independent of auxiliary equipment. A hoist of this type is described and illustrated in United States Patent 2,410,777 issued to Frank E. and Mark A. English, November 5, 1946. The hoist described in the aforesaid United States patent comprises a track running substantially horizontally along the truck body, a slider slidable in the track, a mast pivotally mounted at one end to the slider, a guide pivot mounted above the track at the rear end of the truck and engaging the mast to guide it to and hold it in a vertical position and a cable running through the mast to a winch. The arrangement is such that, when not in use, the mast extends along the side of the truck above the track between the slider and the guide pivot. In this position the cable extending through the mast follows the track from the lower end of the mast to the winch located adjacent the opposite end of the track. When the cable is reeled in on the winch, the slider travels along the track towards the back end of the track, the guide pivot causing the mast to be elevated to a vertical position when the slider reaches the rear end of the track.

We have now made improvements in the hoist as described above which facilitates its operation and extends its field of use. Accordingly, the present invention contemplates a hoist comprising an elongated track, a slider slidably mounted in the track, a mast pivotally mounted at one end to the slider and lying in a substantially vertical plane passing through the track, a pivot mounted above the track and adjustable on a line parallel to the axis of the track, the mast being slidably mounted to the pivot member, a cross arm on the upper end of the mast, flexible means connecting the pivot member to one end of the cross arm, a winch, a cable extending from the opposite end of the cross arm through the mast to the winch, and spring-loaded means mounted adjacent the track and adapted to urge the lower end of the mast out of vertical position.

In many situations, it is found that an ice truck

2

positioned to load a refrigerator car is on sloping ground so that a mast extending truly perpendicularly from the body of the truck will be inclined toward or away from the refrigerator car. Accordingly, we have provided, in accordance with the present invention, a guide pivot which is quickly and easily adjusted along the longitudinal axis of the track to permit variation of the angular position of the mast with respect to the truck when the mast is in operating position. Additionally, and when the mast is in operating position, we have found from past experience that there is some difficulty in returning the mast to the lowered position when the cable is released from the winch. Heretofore, it has been necessary to employ some means to start the travel of the slider along the track back towards the non-operating position. Accordingly, we have provided a spring-loaded propulsion means which gives the lower end of the mast a thrust when it is released urging it away from the balanced position.

These and other features of the invention will be more clearly understood from the following detailed description taken in relation to the accompanying detailed drawings wherein:

Fig. 1 is an elevation of a preferred form of the hoist in accordance with our invention mounted on the side of a motor truck;

Fig. 2 is a plan view of the hoist taken on the line 2—2 of Fig. 1;

Fig. 3 is a sectional elevation taken on the line 3—3 of Fig. 1;

Fig. 4 is a sectional elevation taken on the line 4—4 of Fig. 2 showing the mast in the raised position;

Fig. 5 is a diagram showing the manner in which the cable is connected in the hoisting means;

Fig. 6 is a plan view on the line 6—6 of Fig. 1; and

Fig. 7 is a side elevation of the pivot means shown in plan in Fig. 6.

Referring to the drawings and particularly to Figs. 1 and 2, a horizontal track 10 is mounted on the outside of a truck body 11 and extends parallel to the body from cab 12 of the truck to the rear end of the body 11 terminating in a housing 13. A slider 14 is mounted in the track to slide therein from the forward end of the track adjacent cab 12 to the rear end of the track adjacent the back of truck body 11. The track 10 and slider 14 are shown in greater detail in Fig. 3 which is a sectional elevation on the line 3—3 of Fig. 1. As illustrated in Fig. 3, the track

10 comprises a pair of channel members 10A, 10B supported by a bracket 16 having two spaced legs 16A, 16B so as to open inwardly towards each other and to lie parallel to each other. The bracket 16 is affixed to a platform 17 extending outwardly from the truck body 11. The slider 14 comprises a rectangular block adapted to fit within the opposing track members 10A, 10B of the track and to travel along the track.

A mast 18, which is preferably tubular in form to minimize the weight thereof is hinged to the slider 14. The hinge means comprises a pair of end brackets 20, 21 affixed to and extending upwardly from the upper surface of slider 14 and having an axle or pivot pin 22 journalled therethrough. A hinge member 24 is affixed to the lower end of mast 18 (see Fig. 3) and is mounted on the pivot pin 22, the arrangement is such that when the mast is in the vertical position, the lower edge thereof will rest on slider 14 (see Fig. 4).

A notched catch 26 is mounted to and extends rearwardly from slider 14 and is engaged, when the mast is in vertical position, by a vertical pawl 27 slidably mounted on the rear face of housing 13 by studs 29, a lever arm 30 mounted on a shaft 31 engages the lower portion of pawl 27 and provides means for lifting the pawl free of catch 26.

A guide pivot 32 is mounted above the rear end of track 10 on a framework 33. The guide pivot is shown most clearly in the plan view of Fig. 6 taken on the line 6—6 of Fig. 1 and in the elevation view of Fig. 7 and includes a tubular sleeve 36 pivotally mounted in a bracket 37, the bracket being supported by the aforementioned framework 33. The tubular sleeve 36 has a pair of axles, extending therefrom perpendicular to the longitudinal axis of the sleeve the axle 38 being visible in Fig. 6. The bracket 37 is slotted on its opposite sides as for example slot 40 and the axles of the sleeve are slidably journalled in the opposite slots in the bracket. Conveniently a brass bearing block 42 is slidably mounted in each of the slots 40 and the axles are journalled in these blocks. Bearing block 42 is shown mounted in slot 40 (see Fig. 6). Cover plates 44, 45 are fastened to the outside of bracket 37 over the slots therein to hold the bearing blocks within the slots. The cover plates 44, 45 are shown in Fig. 6, and one of the cover plates appears in the side elevation shown in Fig. 7. A yoke 48 is journalled to the axles of the sleeve inside of the bracket and is connected to an adjusting screw 50 threaded through the end of the bracket. The positioning of sleeve 36 with respect to the longitudinal axis of the bracket 37 may be adjusted by turning the screw 50. Referring again to Fig. 1 which shows the mast in vertical position in dotted lines, it is evident that the angular orientation of the mast in a vertical plane passing through track 10 may be adjusted by adjustment of the sleeve 36 in bracket 37, this being accomplished by adjustment of screw 50.

A cross arm 54 is connected to the upper end of the mast by a universal joint 55 which permits the cross arm to rotate around the top of the mast and also permits angular movement between the cross arm and the mast. An ice holding means, as for example tongs 56, is suspended from a cable 58 which passes over a pulley 59 located at one extremity of the cross arm 54. The cable extends back along the cross arm 54 and over a pulley 60 down through mast 18 and back along track 10. At the rear end of track 10 the cable passes over a pulley 62 rotatable on an axis transverse to the longitudinal axis of the track and from thence around a pulley 63 rotatable on an axis perpendicular to the axis of pulley 62 and parallel to the longitudinal axis of the track and from thence to a winch 64. The arrangement of the cable is shown diagrammatically in Fig. 5.

As shown in Figs. 3 and 4, slider 14 has a central bore 65 through which the cable 58 passes when the mast is in vertical position and a longitudinal channel 66 extending from the central bore to the rear end of the rider. Channel 66 is substantially semi-circular in section and joins the central bore 65 in a smooth curve on a radius of the axis of rotation of hinge member 24. A curvilinear guide flange 68 is mounted on the rider and forms a continuation of the channel 66. The channel and guide flange orient cable 58 when the mast is in non-operating position as in Fig. 1. The arrangement is such that when the mast is in the lowered position as shown in Figs. 1 and 3, the cable passes along the guide flange 68 and groove 66 of the rider back along track 10 to the pulley 62. When the mast is in the vertical position shown in Fig. 4, cable 58 passes through bore 65 in slider 14, barely touches pulley 62 and passes around pulley 63 to the winch 64. As the mast slides toward the non-operating position, i. e. towards the left in Fig. 4, the cable is guided by the curvilinear channel and flange 68 so that it is threaded over the pulley 62.

As shown most clearly in Figs. 1, 2 and 4, a spring-loaded ejection mechanism is mounted adjacent the rear end of track 10 and directly above the track. This mechanism comprises a pair of parallel rods 70, 72 extending between brackets mounted on the upper face of channel members 10A and 10B respectively. A tubular sleeve is slidably mounted on each of rods 70, 72, sleeve 73 bein slidable on rod 70 and sleeve 74 being slidable on rod 72. The rear end of the two sleeves are joined together with a transverse tie-rod 76. The forward end of each of the sleeves 73, 74 is closed around the rod to which it is mounted and retains a helical spring which extends from the forward end of the sleeve rearwardly to the end of the corresponding rod. In the released position shown in Fig. 2, the tie-rod 76 of the ejection means lies approximately above pulley 62 i. e. in the path of the mast as it travels from the non-operative to the operative position. As the mast is raised to the operating position by winding the cable on winch 64, the hinge member 24 strikes the tie-rod 76 displacing sleeves 73, 74 towards the rear end of the track against the loading of the enclosed springs. When the mast reaches the extreme rear end of the track, i. e. when it is in operation position, catch 26 is engaged by pawl 27 as shown in Fig. 4 holding the mast in this position and the ejection means under spring tension. As soon as the catch 26 is released by means hereinbefore described, the compressed springs within the ejection means expand forcing the lower end of the mast toward the forward end of the track i. e. toward the left in Fig. 4. Once the mast balance has been disturbed in this manner, the slider 14 will continue to travel towards the forward end of the track as the cable 58 is payed off of the winch 64.

Assuming that the truck is loaded with ice and that the mast is in its lowered position as in Fig. 1, the operation is as follows. With the truck

alongside a refrigerator car, the winch is driven to reel in the cable. Hook **57** on the tongs **56** acts as a stop jamming in pulley **59** at the end of the cross arm. As the cable is reeled in, slider **14** is pulled to the rear end of the track, i. e. towards the right in Fig. 1. This raises the mast which slides in the pivot sleeve **36** while the sleeve is pivoting from the position shown in Fig. 1 to the position shown in Fig. 7. When the mast reaches the vertical position which is achieved as the slider reaches the rear end of the track, catch **26** engages in pawl **27** holding the mast in this position. At the same time, and in the manner described above, the ejection carriage is displaced toward the rear end of the track compressing the springs which load the carriage by engagement of tie-rod **76** against the mast hinge **24**.

After the mast is locked in vertical position, the pivot sleeve **36** may be adjusted along a line parallel to the longitudinal axis of the track by appropriate manipulation of screw **50** to the point where the mast is substantially parallel to the side of the refrigerator car to be loaded. This adjustment represents a simple and accurate means for compensating the mast for deviations of the track from the true horizontal position. If the winch is then reversed, the ice tong **56** may be dropped to the truck or the ground where a load is affixed. By again winding in the cable, the load, say a cake of ice is raised to an appropriate position for loading on to the top of the refrigerator car or into any other elevated receptacle.

To properly position the cross arm **54** with respect to the mast **18** and the particular loading job involved, the end of the cross arm opposite the lifting end i. e. opposite the cable carrying end is connected by means of a flexible chain or cable **80** to a perforated ring **82** mounted on the upper end of the pivot sleeve **36**. As shown in Fig. 6, the ring **82** is provided with a plurality of holes **84** around its circumference in any one of which the cable **80** may be affixed. Cross arm **54** is not centered on the mast **18** and the lifting end thereof is longer than the opposite end to which cable **80** is affixed. Hence the balance is such that the cross arm will automatically assume a position with the short or anchored end extending from the axis of the mast in the direction of the particular hole in ring **82** to which cable **80** is attached. In this position the short end of the mast will be at the maximum distance from the ring **82**.

When the particular loading job has been completed, catch **26** is released by momentary elevation of pawl **27** by means hereinbefore described. Upon releasing the catch, the ejection mechanism through the medium of tie-rod **76** pushes the lower end of the mast and consequently slider **14**, toward the forward end of the track a sufficient distance to disturb the balance or dead centering of the mast. Thereafter, as the cable **58** is payed off of winch **64**, rider **14** will slide along the track to the extreme forward end and the mast will be returned to the non-operating position shown in Fig. 1.

The hoisting means herein described, while similar in some respects to that described and illustrated in the aforementioned United States Patent 2,410,777, represents a considerable advancement in the art by virtue of the many improved features described herein and including the horizontal adjustable pivot sleeve, the automatic ejection means, the cross arm orientating means and improvements in the slider which automatically and properly positions the operating cable.

We claim:

1. In a hoisting mechanism, the combination which comprises a track, a slider slidably mounted in the track, a mast pivotally mounted at one end to the slider, a cross arm mounted on the opposite end of the mast, a bracket, means mounting the bracket above the track, a tubular sleeve, means connected to the bracket and the sleeve pivotally supporting the sleeve on a horizontal axis transverse to the axis of the track, means for adjusting the location of the supporting means for the sleeve along a line parallel to the longitudinal axis of the track, the mast being slidably mounted in the sleeve, an annular ring affixed to the upper end of the sleeve, and flexible means affixed to an end of the cross arm and detachably affixed to the annular ring.

2. In a hoisting mechanism including a track, a slider slidably mounted in the track, a mast pivotally mounted to the slider, a hoisting means and a cable connected to the hoisting means and passing along the mast and the track, the improvement which comprises a bracket, means mounting the bracket above the track, the sides of the bracket being parallel to the track and having elongated slots therein, a tubular sleeve mounted around said mast, a pair of pivot pins affixed to and extending from the sleeve diametrically opposite each other and a line perpendicular to the longitudinal axis of the sleeve, the pivot pins being slidably journalled in the slots in said bracket, and a yoke suspended within the bracket on a stem threaded through the end of the bracket with the legs of the yoke engaging said pivot pins so that the sleeve may be adjusted within said bracket in the direction of said slots by turning said stem.

3. In a hoisting mechanism including a track, a slider slidably mounted in the track, a mast pivotally mounted at one end to the slider, a cross arm mounted on the opposite end of the mast, a hoisting means and a cable connected to the hoisting means and passing along the mast and the track, the improvement which comprises a sleeve, means pivotally mounting the sleeve above the track on a horizontal axis transverse to the axis of the track, adjustable means for moving the mounting means for the sleeve along a line parallel to the longitudinal axis of the track, the mast being slidably mounted through the sleeve, and an annular ring affixed around said sleeve in a plane perpendicular to the longitudinal axis of the sleeve, and cable means affixed to one end of the cross arm and detachably affixed to the annular ring.

4. In a hoisting mechanism including a track, a slider slidably mounted in the track, a mast pivotally mounted to the slider, a hoisting means, a cable connected to the hoisting means and passing along the mast and track, a pivot member, means mounting the pivot member above the track so that the pivot member is supported about a horizontal axis transverse to the length of the track, the mast being slidably mounted in the pivot member so that as the cable is shortened the slider travels along the track in the direction of the pivot member to raise the mast to a vertical position, and catch means for holding the mast in vertical position, the improvement which comprises a spring-loaded plunger, means for mounting the plunger above the track, means connected to the plunger for engaging the mast as it is raised to vertical posi-

tion to displace the plunger against the spring-loading.

5. In a hoisting mechanism including a track, a slider slidably mounted in the track, a mast pivotally mounted to the slider, a hoisting means, a cable connected to the hoisting means and passing along the mast and track so that as the cable is shortened the rider travels along the track, the improvement which comprises a pair of spring-loaded plungers, means for mounting the plungers spaced from each other and above the track, means connecting the plungers and positioned to engage the mast as it is raised to vertical position to displace the plungers against the spring-loading, a pivot member, means mounting the pivot member above the track so that the pivot member is supported about a horizontal axis transverse to the length of the track, and means for adjusting the location of the mounting means for the pivot member along an axis parallel to the longitudinal axis of the track, the mast being slidably mounted through the pivot member.

6. In a hoisting mechanism including an elongated track, a slider slidably mounted in the track, a mast pivotally mounted at one end to the slider, a bracket, means mounting the bracket above the track, a tubular sleeve mounted around the mast, a pair of pivot pins extending between

the sleeve and the bracket for pivotally supporting the sleeve about a horizontal axis transverse to the length of the track, and a universal joint connected to the other end of the mast, the improvement which comprises a cross arm mounted on the universal joint at a location offset from the midpoint of the length of the cross arm so that one portion of the cross arm is shorter than the other portion, an elongated flexible member connected to the end of the shorter portion of the cross arm, and means for detachably connecting the flexible member to the sleeve at any one of a plurality of angular locations around the sleeve.

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