

Feb. 25, 1930.

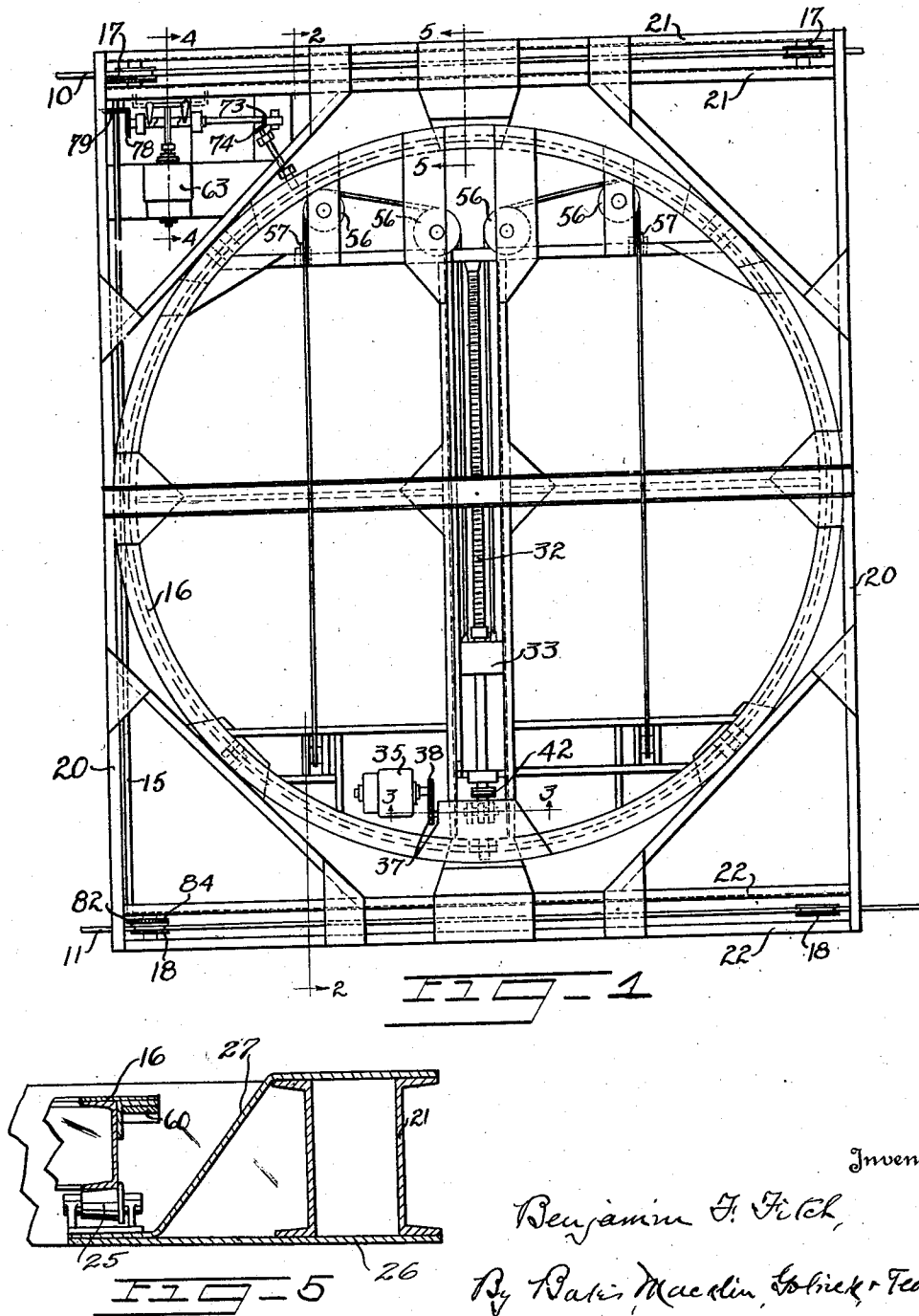
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1,748,708

TURNTABLE CRANE

Filed March 30, 1925

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

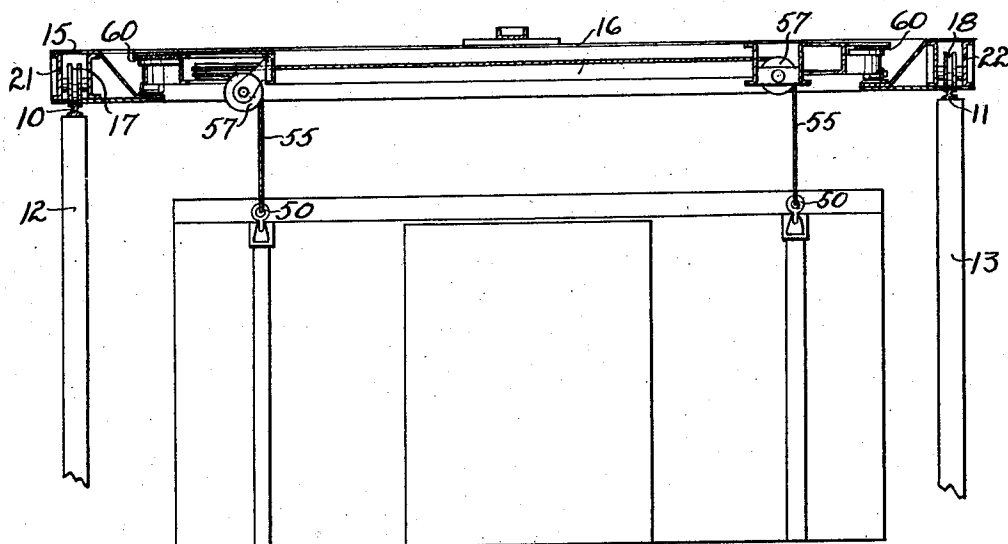


FIG. 2

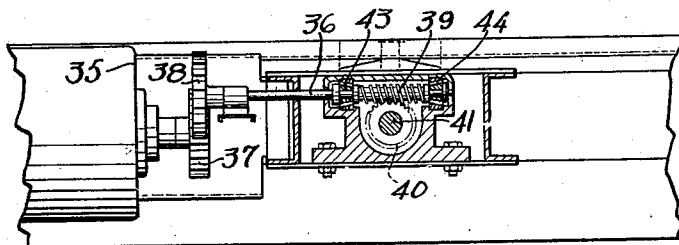


FIG. 3

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3 Sheets-Sheet 3

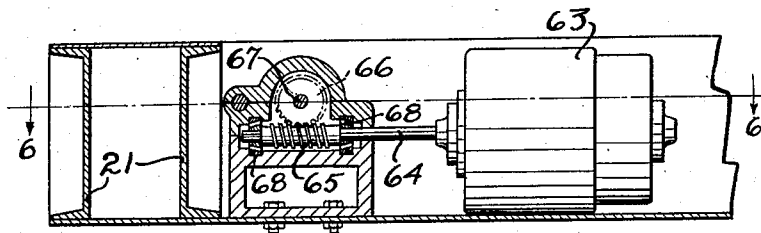


FIG. 4

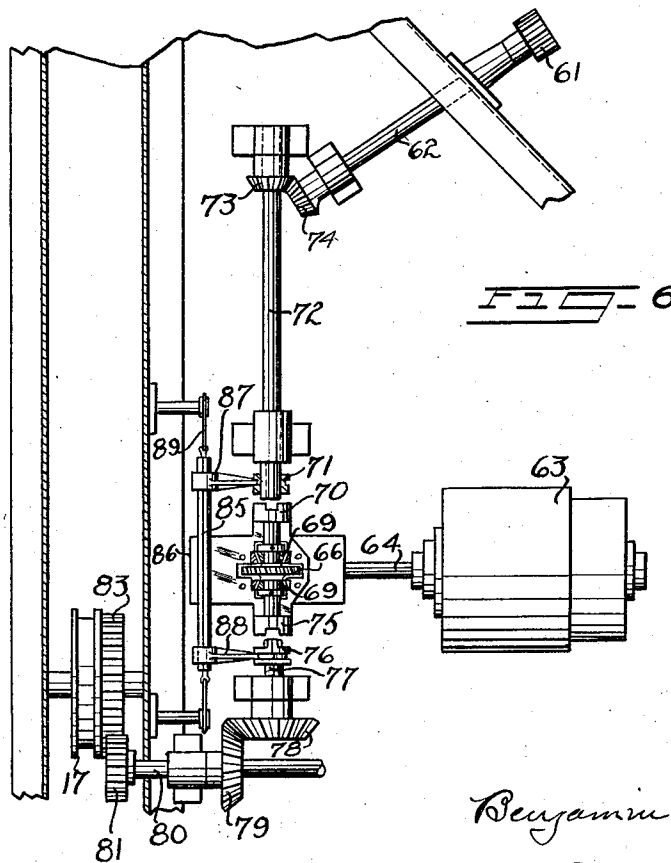


FIG. 6

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UNITED STATES PATENT OFFICE

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TURNTABLE CRANE

Original application filed March 30, 1925, Serial No. 19,280. Divided and this application filed February 4, 1926. Serial No. 85,877.

This invention embodies a division of my co-pending application, Serial No. 19,280, filed March 30, 1925, and relates to hoisting and conveying apparatus, and is particularly concerned with the provision of a crane adapted to travel on overhead tracks. Such a crane is especially adapted for use in a system for handling freight wherein freight is stored in removable automobile bodies or containers.

In handling freight by such a system, it is desirable to adapt the apparatus to existing conditions without requiring extensive changes to be made in the construction of warehouses, platforms or runways adjacent thereto. The size of a removable container which has been found to give the most satisfactory results for handling freight is such, however, that the average warehouse or freight station is not constructed to receive a standard size crane and to admit the container. Accordingly, extensive altering and shoring must be resorted to in order to strengthen the structures and to render them safe for handling loaded containers by means of an overhead crane. An additional characteristic frequent in existing structures is the low head room, which greatly hinders the use of standard size cranes.

A further problem which arises in the handling of freight by the use of removable automobile bodies is the difficulty of positioning a motor vehicle at right angles to a station platform. This difficulty arises by reason of the fact that the street adjacent a platform is frequently very narrow and that the motor vehicles employed for conveying freight are too long to permit the normal flow of traffic along the street if the vehicles are disposed at right angles to the platform. In order, therefore, to permit the handling of heavy loaded containers, it is desirable to use electrically operated overhead cranes which may raise a load, turn it and then transport it from one place to another. The size and weight of the containers, however, present a serious problem in the designing of a crane which will have sufficient power to raise the load and to permit the turning thereof without making important and extensive changes in the construction of the building.

One of the objects of the present invention therefore, is the provision of a crane which while possessing a minimum depth still has sufficient power to raise a loaded container in the form of a removable automobile body, turn it and then transport it along an overhead trackway. Further objects are to shorten materially the span required to support such an overhead crane, yet to permit the turning of the load through a complete revolution.

To carry out the above objects, I employ a crane which has a main frame movable along an overhead trackway. The main frame carries a supplemental frame which embodies a turntable having hoisting mechanism mounted thereon. To permit the crane to have a minimum depth, the supplemental frame is disposed within planes which define the upper and lower surfaces of the main frame.

The preferred means for carrying out my invention is illustrated in the drawings wherein Fig. 1 is a plan view of a crane embodying my invention; Figs. 2, 3, 4 and 5 are sections taken through the crane on planes indicated by the correspondingly numbered lines in Fig. 1; Fig. 6 is a section taken on an enlarged scale through the crane and on a plane indicated by the line 6-6 in Fig. 4.

In Figs. 1 and 2 the crane embodying my invention is illustrated as supported upon overhead tracks 10 and 11 which are carried on columns 12 and 13 respectively. The crane embodies a main frame indicated in general at 15 and a supplemental frame indicated in general at 16 which is carried by the main frame and is arranged to be rotated through a complete revolution with reference there-

to. Wheels 17 and 18 journaled in the main frame, are arranged to travel on the tracks 10 and 11 respectively. These wheels as shown are slightly less in diameter than the depth of the main frame. The main frame may have longitudinal webbed beams 20 which are connected at the ends by transverse webbed beams 21 and 22 respectively. The end members are arranged in pairs so as to support the wheels in a conventional manner.

To support the supplemental frame within the main frame, I have shown a plurality of spaced rollers 25 which are mounted radially and are arranged to engage the underside of the supplemental frame adjacent the periphery thereof. As shown in Fig. 5, each roller is supported upon an inwardly extending bracket comprising a horizontally disposed plate 26 and an inclined plate 27 which are rigidly secured to the frame work of the main frame.

The supplemental frame as shown embodies a circular frame having a periphery comprising an inwardly facing channel-shaped beam 30, the lower flange of which rests upon the rollers 25. The supplemental frame carries hoisting mechanism which preferably includes a screw and nut couple as illustrated by a threaded shaft 32 and a nut 33. The nut is arranged to travel along the shaft whenever the shaft is rotated. The means for rotating the shaft is shown more particularly in Fig. 3 as embodying an electric motor 35 which drives a shaft 36 by means of gears 37 and 38. A worm 39 on the shaft 36 meshes with a worm wheel 40 which is rigidly secured to a shaft 41. A coupling 42 indicated in general in Fig. 1 may then connect the shaft 41 with the threaded shaft 32. In Fig. 3 thrust bearings 43 and 44 are shown associated with the worm 39.

I have indicated four load engaging members such as hooks 50 and 51 which are adapted to engage a load at four points. These hooks are fastened at the lower ends of cables 53, each of which is attached at one end thereof to the nut 33, wherefore the cables are simultaneously operated to raise or lower a load. Horizontally disposed guide sheaves 56 at one end of the frame, and vertically disposed guide sheaves 57 function to lead the cables outwardly and then downwardly with respect to the supplemental frame.

To rotate the supplemental frame with reference to the main frame, I have shown the supplemental frame as having an annular rack 60 which is arranged to be engaged by a pinion 61 on a shaft 62. A motor 63, shown more particularly in Fig. 6 may be used for selectively actuating the shaft 62 to rotate the supplemental frame or to rotate one of the wheels 17 for propelling the frame along the overhead trackway.

The mechanism illustrated in Figs. 4 and 6 embodies a worm 65 on the armature shaft

64 for actuating a worm wheel 66 on a shaft 67. Thrust bearings 68 adjacent the worm, and thrust bearings 69 adjacent the worm wheel function to absorb working stresses in the usual manner. One end of the shaft 67 carries one member 70 of a clutch which is adapted to engage a coacting member 71 for effecting rotation of shaft 72, and through the medium of bevel gears 73 and 74, for effecting rotation of the pinion 61. The opposite end of the shaft 67 is indicated as having a clutch member 75 which is arranged to engage a coacting member 76 for effecting rotation of shaft 77. Bevel gears 78 and 79 function to transmit rotation of shaft 77 to shaft 80, while pinions 81 and 82 at opposite ends of the shaft 80 mesh with gears 83 and 84 respectively, for effecting simultaneous operation of one traction wheel 17 and one traction wheel 18 on the tracks 10 and 11 respectively.

To effect movement of the crane along the over head trackway, I have shown a shipper rod or slide 85 which is slidably mounted on a bearing block 86 and which carries shipper levers 87 and 88 respectively. A flexible member 89 may have the ends thereof attached to the slide and may extend downwardly so as to be accessible beneath the crane. If the operator desires to move the main frame along the overhead trackway, the slide is moved to effect engagement of the clutch members 75 and 76 whereupon a direct connection is made between the armature shaft of the motor 63 and the traction wheels on the main frame. If it is desired to rotate the supplemental frame, then the slide is moved to effect engagement between the clutch members 70 and 71 whereupon the pinion 61 is caused to rotate. The shipper levers 87 and 88 are rigidly mounted upon the slide in such manner that when one of the clutches is connected with the motor, the other clutch is disconnected from the motor. Thus the supplemental frame can be turned only while the main frame is stationary, while the main frame can be propelled along the trackway only when the supplemental frame is stationary.

The particular advantage of a turn table crane made in accordance with my invention is the small overall depth coupled with adequate capacity for raising comparatively heavy loads. Moreover the present invention is particularly adapted for use in connection with the handling of freight with removable automobile bodies, since the supplemental frame may be rotated with reference to the main frame, wherefore the load may be readily engaged even though the motor truck is not disposed in proper aligned position with reference to the main frame.

I claim:

1. In a crane, the combination with a main frame comprising side beams and end beams,

said beams embodying webbed members, plates extending inwardly from said members at spaced intervals, rollers positioned on said plates, a supplemental frame supported on said rollers so as to be rotated a complete revolution, and mechanism for rotating the supplemental frame with reference to the main frame.

2. In a crane, the combination with a main frame comprising side beams and end beams, the end beams having wheels journaled therein for causing the main frame to travel along an overhead trackway, spaced members attached to the top and bottom of said beams and projecting inwardly therefrom, rollers positioned radially on said members, a supplemental frame supported on the rollers and arranged to be turned a complete revolution with reference to the main frame.

3. In a crane, the combination with a main frame adapted to travel upon an overhead trackway, spaced rollers carried by the main frame and disposed radially between the top and bottom of the main frame, a supplemental frame bounded by a circular beam supported upon said rollers, means for enabling the supplemental frame to be rotated with reference to the main frame, hoisting mechanism carried by the supplemental frame within such bounding beam, said mechanism and said supplemental frame lying between planes which define the top and bottom of the main frame.

4. In a crane, the combination with a main frame, of a supplemental frame mounted thereon and adapted to be turned with reference to the main frame, hoisting mechanism including a diametric screw within the supplemental frame, bearings for said screw on opposite sides of the frame axis, a nut on said screw, horizontal and vertically disposed sheaves also mounted within the supplemental frame, and flexible load engaging members actuated by said nut and passing over said sheaves.

5. In a crane, the combination with a main frame adapted to travel along a trackway, rollers mounted radially upon the main frame, a supplemental frame having a circular bounding beam supported on said rollers and arranged to be rotated with reference to the main frame, an electric motor carried by the main frame, and means for selectively actuating the motor either to propel the main frame along the trackway or to turn the supplemental frame with reference to the main frame.

6. In a crane, the combination of a main frame adapted to travel on an overhead trackway, radial rollers carried by the main frame, a supplemental frame bounded by a circular beam supported on said rollers, said supplemental frame having within it two parallel beams on opposite sides of its axis extending from one side of the circular beam to the sub-

stantially diametrically opposite side, a nut slidably mounted on said circular beam, a rotatable diametric screw between the parallel beams engaging the nut, said screw being supported at its opposite ends by means secured to the circular beam, cables anchored to the nut, and sheaves carried by the supplemental frame for directing said cables outwardly and downwardly.

In testimony whereof, I hereunto affix my signature.

BENJAMIN F. FITCH.

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