Dec. 15, 1936. B. F. FITCH 2,063,913

GANTRY CRANE

Original Filed Jan. 24, 1934 2 Sheets-Sheet 1

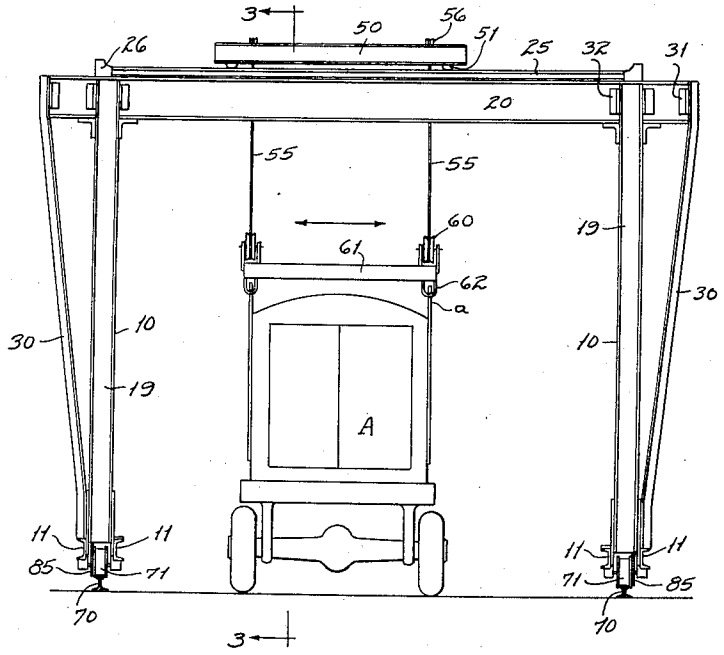


FIG. 1

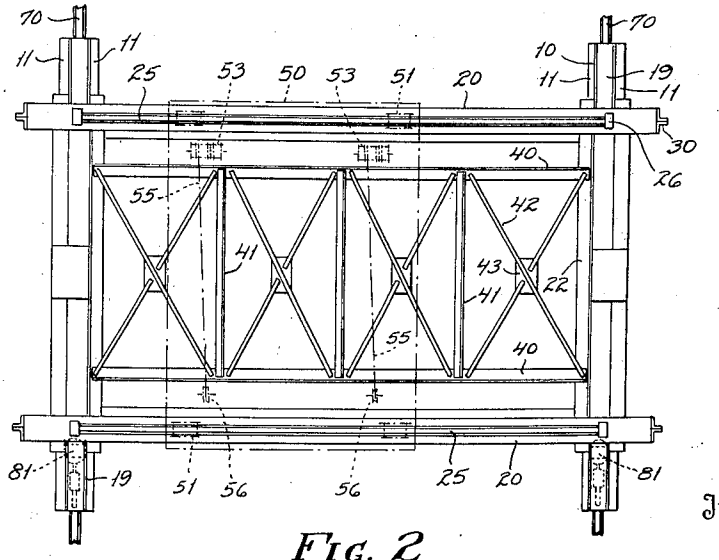


FIG. 2

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GANTRY CRANE

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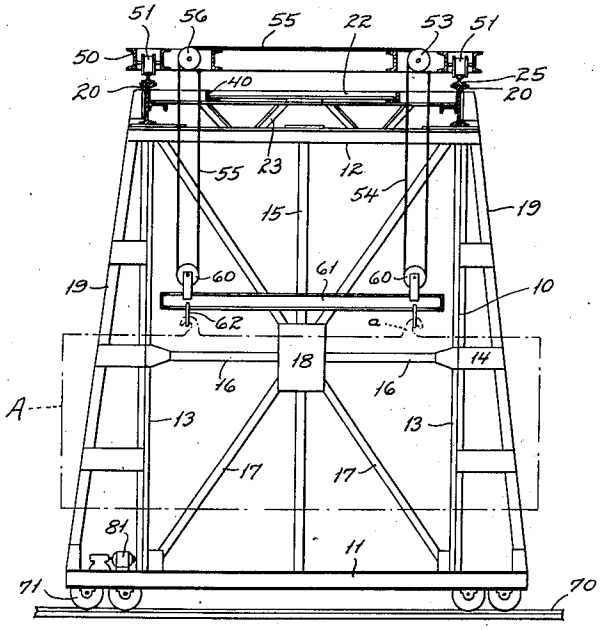


FIG. 3

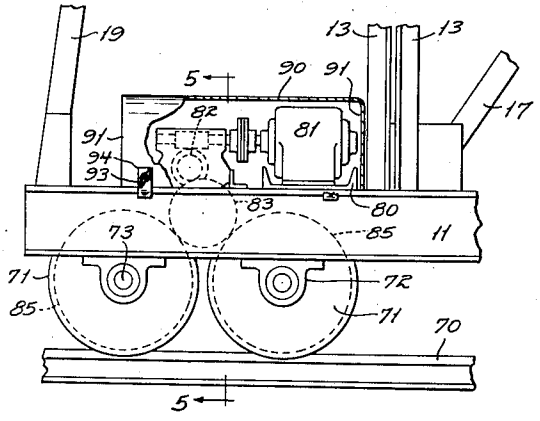


FIG. 4

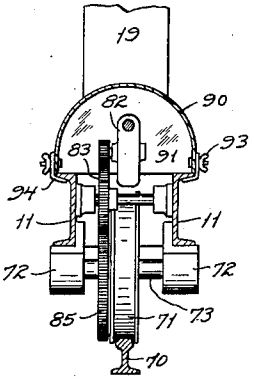


FIG. 5

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UNITED STATES PATENT OFFICE

2,063,913

GANTRY CRANE

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Original application January 24, 1934, Serial No. 708,125. Divided and this application September 15, 1934, Serial No. 744,214

9 Claims. (Cl. 212—13)

This invention relates to a gantry adapted to carry an overhead traveling crane, and is more particularly concerned with a movable gantry which may span a truck runway and, if desired, also a railroad track or a station platform, or both, enabling such gantry and its supported crane to be effectively used to transfer demountable bodies between a truck and a railroad car or station platform.

The present application is a division of my copending application No. 708,125, filed January 24th, 1934, showing the gantry of this case surmounted by a traveling crane arranged to engage a demountable automobile body in the space beneath the gantry bridge.

One of the objects of the present invention is to provide such gantry in the form which shall give a maximum clearance between the legs, thereby enabling the ready handling of demountable automobile bodies without requiring undue increase in the size of the gantry.

Another object of the invention is to so support the top of the gantry that it is effectively fixed at its opposite ends, thus reducing the bending moment between the sides, enabling the top girders to be of reduced depth and still support the same weight of traveling crane.

Another object is to brace the top in a manner which shall be effective and at the same time allow cables to depend from the hoist at four points corresponding to the four corners of a rectangle so that they may be connected to a demountable automobile body and when so connected may travel laterally to shift the body.

Still another object is to combine the gantry with a propelling mechanism protected by the gantry structure and acting on supporting wheels therefor, and thus adapted to cause the travel of the gantry as a whole.

My invention is illustrated in the drawings hereof and is hereinafter more fully described.

In the drawings, Fig. 1 is an end elevation of my gantry; Fig. 2 is a plan thereof; Fig. 3 is a side elevation; Fig. 4 is a fragmentary side elevation at one of the lower corners of the gantry, illustrating the propelling mechanism; Fig. 5 is a detail of the propelling mechanism, being a vertical section indicated by the line 5—5 on Fig. 4.

As shown in Figs. 1, 2, and 3, my gantry comprises two side members 10 and a top portion 20. The sides are composed of structural metal pieces, suitably bound together by angles and gusset plates. In general, a rectangle is formed (best shown in Fig. 3), comprising a main bottom portion 11, an opposite parallel top portion 12, and vertical legs 13. Internal braces for this rectangle are provided, as vertical members 15, horizontal members 16 and diagonal members 17, which project inwardly from the centers of the top and bottom, and sides, and from the corners, all being joined by the gusset plate 18 at their point of intersection. Downwardly diverging outside braces 19 are provided in the vertical plane of the sides and meeting the legs 13 at the top and intersecting the member 11 at the bottom of the gantry. Suitable plates 14 more firmly fasten the members 19 and 13 together, and said members and plates form longitudinal buttresses at each vertical edge of each gantry side.

The gantry is movable along a track composed of parallel rails 70. Suitable flanged wheels 71, mounted at the corners of the sides, ride on these rails and are driven by means mounted in a special manner on the gantry frame, as will hereinafter be more fully described.

The bridge at the top of the gantry is formed primarily of the two through girders 20 which extend transversely across the top of the legs 13 of the sides. They overhang these legs for some distance and are there attached to structural members 30 which extend inwardly from the ends of the girders to the outer faces of the legs adjacent their bottom where they are effectively secured to the legs, forming inverted buttresses for the gantry frame. The inclined longitudinal braces 19 overlap the sides of the girders and are secured to them. Suitable angle clips 31 and 32 and rivets (not specifically shown) may fasten the members 30 and 19 to the webs of the girders 20.

It results from the construction just described that the girders 20 are fixed at their ends instead of being in effect merely supported at the top of the sides, and as a girder fixed at its ends is twice as strong and four times as stiff as if it was merely supported at its ends, it follows that with my construction a much lighter girder may be employed and still carry the same crane load.

The gantry bridge composed, as stated, primarily of the girders 20, is braced by bars 22 at the top of the sides and lattice members 23, which, with the side-top 12 form vertical trusses. Transversely there is a horizontal lattice truss. As shown in Fig. 2, this lattice construction consists of side bars 40 leading from one side to the other, cross bars 41 and diagonal bracing 42 with suitable gussets 43 at the junctions of the diagonal members.

On top of each girder 20 is a rail 25 adapted to support a suitable traveling crane designated 50 having wheels 51 tracking on the rails. Suitable wheel stops 26 are provided at each end of the rails.

The construction of the top of the gantry as described is designed particularly with reference to a crane having cables depending at four points corresponding to the four corners of a rectangle, two of which cables depend through each of the spaces between one of the girders 20 and the corresponding brace bar 40. Such a crane is shown at 50 in Figs. 1 and 3, and indicated by broken lines in Fig. 2. Mounted in the crane frame directly over the space between one of the girders 20 and the adjacent brace bar 40, is a pair of winding drums 53 from which two cables 54 depend. Two other cables 55 lead from the drums across sheaves 56 directly above the open space. The other side of the gantry top and such cables then depend through such open space.

The four depending cables 54 and 55 are suitably attached either to the body to be lifted or to a suitable cradle adapted to be attached to the body. As shown in Figs. 1 and 3, the cables pass around sheaves 60 on a cradle 61 which has shackles 62 adapted to engage hooks *a* at the eaves of the demountable body A. The long, narrow open spaces in the gantry top, heretofore described, allow the depending cables while supporting the body to shift freely as the crane travels.

The gantry crane, as shown in Fig. 1, is considerably smaller than may be employed. For instance, the height of the sides 10 may be sufficiently increased to allow one body A to be raised above an adjacent body and moved thereover to be deposited on the other side of the latter. Such a change does not affect my invention. Further, the top 20 may be sufficiently widened to provide more spacing between the sides 10, making it possible to accommodate a variety of body supports beneath the top of the gantry. These supports may include loading platforms or conveyances, such as trucks, railroad cars and even ships, as desired.

Means are provided to move the entire gantry crane along the tracks 70, on which it rides. The bottom member 11 of each side is preferably composed of two outwardly facing channel beams spaced apart and secured together at intervals by bridge plates. These beams are shown more clearly in Figs. 4 and 5. On the underside of the bottom beams are journals 72. These journals support shafts 73, which, in turn, carry the flanged wheels 71, engaging the track members 70. There are two of these wheels at each of the four corners of the gantry frame, four wheels to each rail.

The two pairs of wheels adjacent the same end of the two side frames are adapted to be driven, one pair on each rail. Mounted on a support 30, secured to the top flanges of the channel beams 11, is an electric motor 81. This motor is connected to worm reduction gearing 82, and this, in turn, to an intermediate gear 83. Gears 85 mounted on the wheels 71 engage the gear 83. Thus, rotation of the motor 81 drives the geared wheels 71 along the rail 70, moving the gantry crane. Due to the drive being through a worm and its mating wormwheel, a self-locking brake is provided as soon as the motor 81 is cut out of the circuit in which it is connected.

Mounted over each of the two driving mechanisms are protective hoods 90. This hood may be of any shape, although I prefer to make it arcuate, with the ends 91 closed. When placed over the mechanism, this hood rests on the members 11 and is securely locked thereto by wing nuts 93, which clamp angles 94 to underfaces of the top flanges of the channel beams.

It will be seen from the description given that I have provided an effective out-of-door gantry adapted to span supports for different vehicles and carry a suitable crane which may be effective to transfer a body from one vehicle to another or to a platform, if the same is employed beneath the gantry. The specially formed buttresses provide stiffness at each side, both against longitudinal and lateral displacement, while allowing a clear rectangular space between the gantry legs. Furthermore, the inverted buttresses at the sides of the gantry give a double anchorage to the transverse girders so that they are in effect fixed at their ends instead of being merely supported, and thus the bending moment of such girders is greatly reduced. The propelling mechanism for the gantry is out of the way, being housed between the main legs and the longitudinally inclined braces, so that it does not use up valuable space on either side of the legs and is furthermore protected by the structural members of the sides.

I claim:

1. A gantry having an overhead bridge, side members supporting it, said side members having inverted buttresses extending laterally, there being through girders at the top of the gantry extending across the legs thereof and connected with the upper portions of the inverted buttresses, and lateral bracing connecting the top portions of the two sides and extending between the girders in spaced relation to both for substantially their entire length.

2. In a gantry having adjacent its lower end a pair of longitudinal outwardly facing channel beams forming the base of the gantry, wheels having axles mounted on the channel beams, motor mechanism carried on said channel beams and drivingly associated with one of said wheels, the combination therewith of a cover for the motor mechanism, bridging said beams, and clips engaging the cover and extending beneath the upper flanges of the two channel beams.

3. A gantry comprising overhead bridge girders adapted to support tracks for a traveling crane on their top sides and vertical supporting members supporting the two end portions of the girders, outwardly overhung by the extremities of the girders, said supporting members having inverted buttress effects including diagonally disposed straight structurally flanged struts extending outwardly laterally from the bottom ends of the vertical members to the said extremities of the bridge girders, and buttresses wider at the bottom than at the top extending transversely of the bridge girders and from the top to the bottom of the gantry.

4. A gantry comprising an overhead bridge, side members supporting it, said side members each having two vertically upright legs with diagonally outwardly extending straight flanged structural members forming inverted buttress effects on the outer sides of said legs, and spaced through girders at the top of the gantry, connected rigidly with and extending across the legs and the upper ends of the inverted buttress members in vertical alignment therewith, whereby said girders are fixed at their ends against both upward and downward flexure.

5. A gantry having two rectangular side frames disposed vertically in parallel planes, said frames comprising horizontal base and top members and vertical posts mutually interconnected by cross bracing, a top frame connecting the side frames, said top frame including spaced girders adapted to support traveling crane tracks, said girders extending outwardly beyond said side frames, straight diagonal flanged struts disposed outwardly beyond the side frames and connecting said girder extensions to the base members of the side frames to brace said extensions vertically in two directions, the base members of said side frames extending longitudinally beyond the posts, and structural members forming triangular buttresses connecting said extended portions of the base members with the upper ends of the vertical posts.

6. A gantry having a supporting bridge with parallel girders, a diagonally braced truss on said bridge between the girders and rigidly connected with both girders at its end portions in a manner to maintain the girders in fixed relationship with each other, said truss being continuously spaced from said girders laterally therefrom between the girders to provide continual clearance adjacent the girders for cables adapted to depend from a crane on the bridge.

7. Apparatus for handling demountable vehicle bodies, said apparatus comprising horizontally spaced girders forming a supporting bridge, the girders having tracks thereon, a crane movable on said tracks, four cables depending from said crane in positions corresponding to the four corners of a rectangle for engagement with such demountable bodies, and lateral bracing on said bridge beneath said crane, said bracing being continuously spaced from said girders for substantially the entire length of said tracks to provide continual clearance for said depending cables.

8. A gantry comprising an overhead bridge and supporting leg members at the two sides thereof, said bridge having parallel crane-supporting members and having a diagonally braced truss structure connected with both legs, disposed between the crane-supporting members in the horizontal plane thereof and continuously spaced from said crane-supporting members for substantially the entire length of the truss structure to provide clear narrow spaces in which cables adapted to depend from a crane may travel.

9. A gantry having side members and an overhead bridge, each side member including a pair of spaced horizontal base beams, a vertical supporting leg and a brace longitudinally beyond the leg flaring downwardly to the base beams and providing a space between the vertical leg and the brace, wheels supported between the paired base beams and disposed substantially beneath the lower portions of said leg and brace, a motor located in the space between said leg and brace, and gearing between the motor and supporting wheels, said gearing being disposed at least partially between the spaced horizontal beams.

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