H. W. ISRAEL.

TROLLEY FOR TRAVELING CRANES.

APPLICATION FILED AUG. 4, 1908.

935,514.

Patented Sept. 28, 1909.

2 SHEETS—SHEET 1.

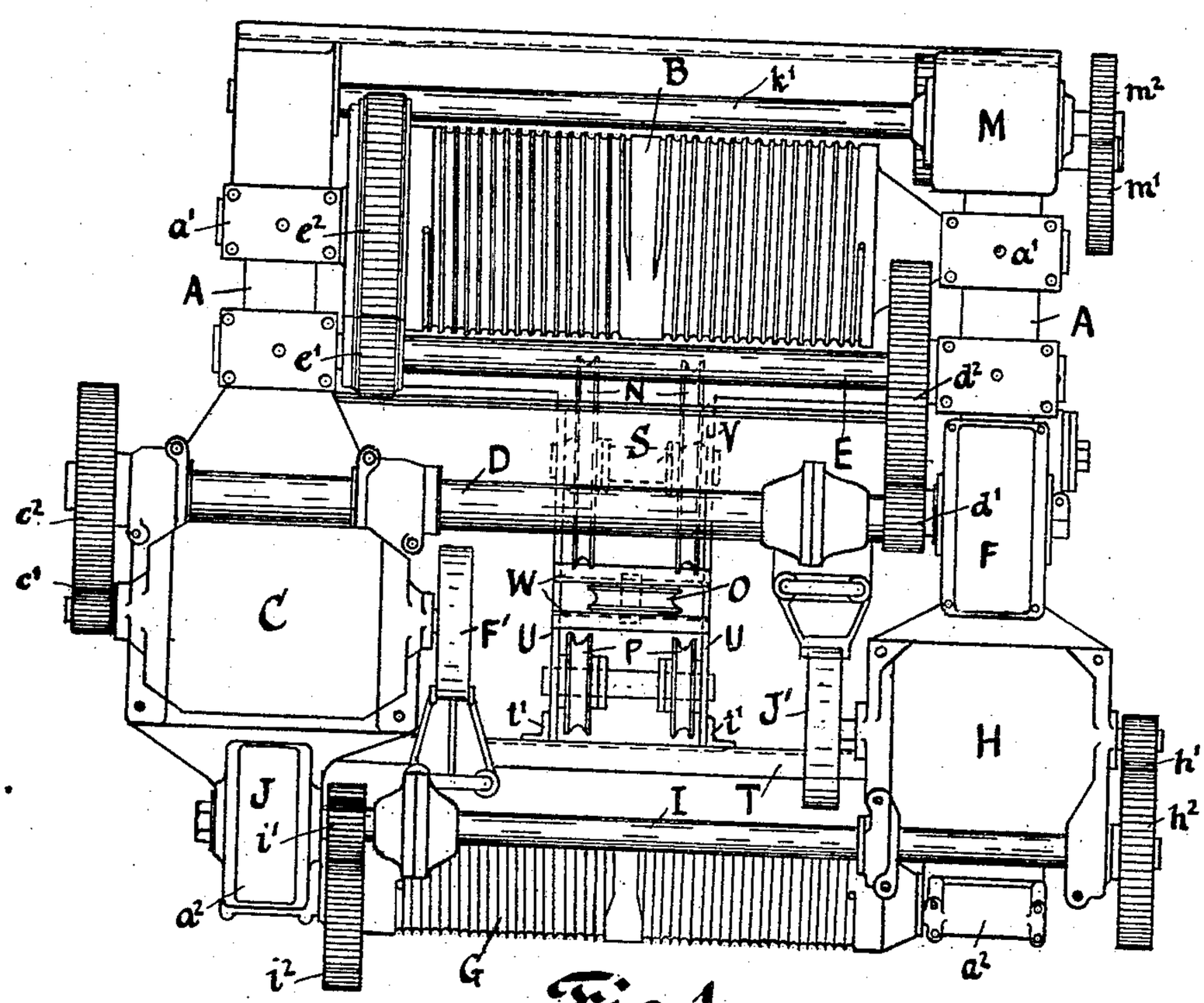

Fig. 1

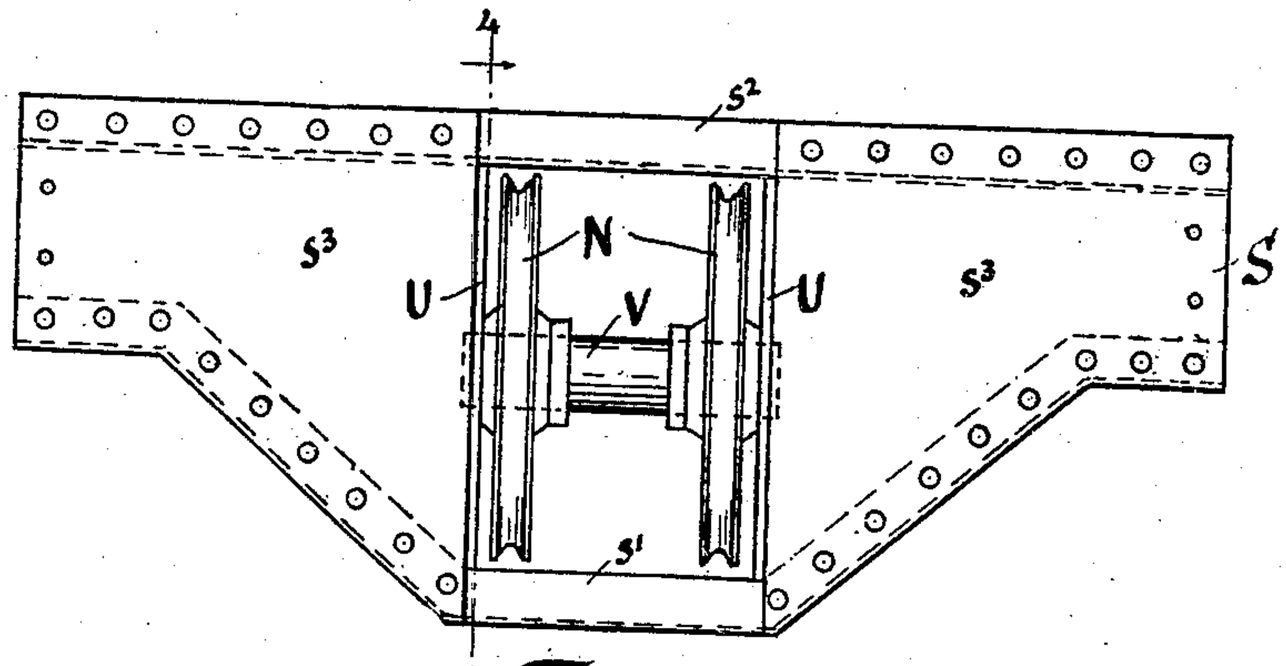

Fig. 2

Witnesses

Geo. P. Hohmann.

Minnie Schienheim

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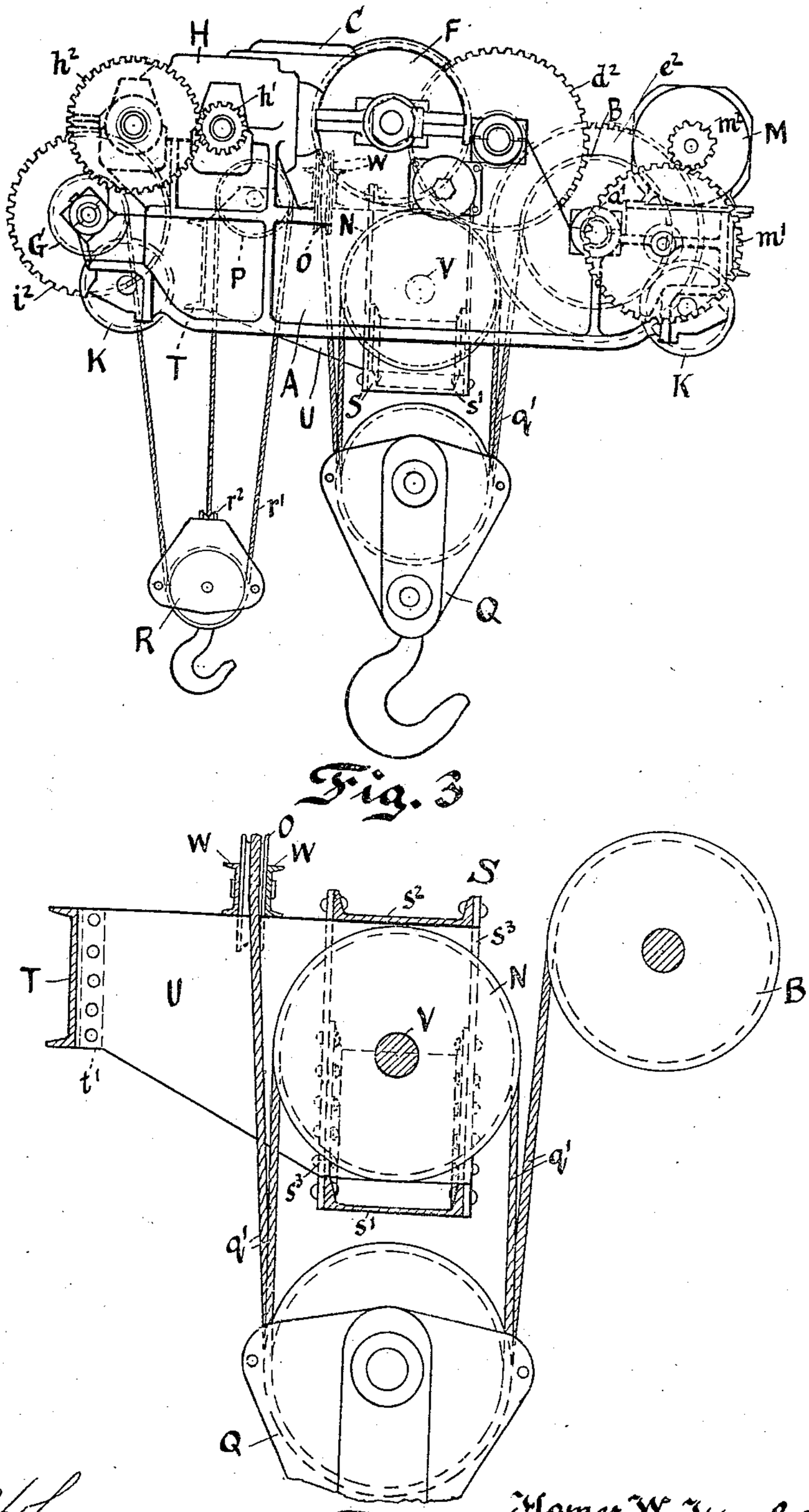

Fig. 3

Fig. 4

Witnesses

Geo. R. Hohman.

Minnie Schienbein

Homer W. Israel, Inventor

By George Wetmore Colles Attorney

UNITED STATES PATENT OFFICE.

HOMER W. ISRAEL, OF WAUKESHA, WISCONSIN, ASSIGNOR TO MODERN STEEL STRUCTURAL COMPANY, A CORPORATION OF WISCONSIN.

TROLLEY FOR TRAVELING CRANES.

935,514. Specification of Letters Patent. Patented Sept. 28, 1909.

Application filed August 4, 1908. Serial No. 446,986.

To all whom it may concern:

Be it known that I, HOMER W. ISRAEL, of Waukesha, Wisconsin, have invented a Trolley for Traveling Cranes, of which the following is a specification.

This application has for its object to improve the trolleys of traveling cranes by providing a structure more compact and strong than that previously in use, especially by so arranging the rope-sheaves as to enable the crane-hook to be raised higher than any previous forms known to me, whereby less head-room for the crane is required. I also aim to provide an improved shape of girder which is both stronger and more economical of metal than that heretofore used so far as I am aware.

The chief feature of my invention consists in providing a hollow box-girder formed of two horizontal channels united by vertical web-plates on their ends and mounting the rope-sheaves in the center of said girder. This I am enabled to do by the special construction and arrangement of the girder.

I have illustrated my improved construction in the accompanying drawings, wherein,

Figure 1 is a plan of the trolley as a whole, Fig. 2 is a side elevation of the aforesaid girder, Fig. 3 is an end elevation of the trolley as a whole, and Fig. 4 is a longitudinal section through said girder on the line 4 of Fig. 2.

In these drawings every like reference letter and numeral refers always to the same part.

The elements of the trolley, as shown, are, generally speaking, (these are referred to merely for clearness' sake, being of the ordinary construction) a frame A; a main cable drum B mounted thereon and turning in bearings a'; a motor C driving the drum B through the medium of the two countershafts D and E connected to the motor and drum B by gear-wheels c', c^2, d', d^2, and e', e^2 respectively; a back-motion clutch F and brake F′ for the winding-mechanism on the motor C; a secondary drum G belonging to the auxiliary hoist, mounted in bearings a^2; a motor H mounted on the opposite side of the frame from the motor C; a countershaft I connecting the motor H with the drum G through gear-wheels h', h^2, i', i^2; a back-motion clutch J and brake J′ for this motor; four truck-wheels K, on which the frame A rests, and connected by axles k'; and a driving-motor M for one pair of wheels K connected thereto by gear-wheels m', m^2. In the center of the frame a plurality of rope-sheaves N, O, and P are rotatably mounted in the positions shown in the drawings and for the purpose of suspending a main hoist-hook Q and an auxiliary hook R, suspended by cables q' and r' respectively. There are various ways of reeving the ropes q' and r' well known to the art and forming no part of my present invention, but as herein shown the small transverse sheave O acts as an equalizer for the double cable q', one turn of which is taken around each of the sheaves N, and the cable r' is similarly reeved around the sheaves P, a sheave r^2 on the hook R acting as the equalizer.

The method of suspension of these sheaves constitutes my present invention. Heretofore the sheaves N were supported either below the transverse supporting beam or above it. In the former case it diminished the available head-room for hoisting the hook Q by extending below the trolley-frame, and in the latter case it interfered with the arrangement of the countershafts D and E, or other apparatus on the trolley. In my present arrangement this beam, here shown as a girder S, is consolidated with the sheaves N by arranging them in the center thereof, thus not only economizing space, but at the same time enabling me to make the beam S considerably deeper than would otherwise be practicable and therefore to economize material and at the same time make a lighter and stronger girder. This girder S is made up as follows: Two horizontal channels s' and s^2 laid with their flanges preferably on top are flanked at their side-edges by four web-plates s^3, which extend from the ends to points equidistant from and on opposite sides of the center of the beam. Either or both of the channels s', s^2 may be bowed centrally to make the beam deeper in the center than at the end; herein only the lower channel is so shown, the upper one being straight. Another transverse beam T, herein shown as a channel, extends across the frame on the auxiliary-hoist side, and in connection with the girder S, supports a pair of cross-plates U, which are secured to the beam T in any preferred manner as by angles t', and extend

into the central opening of the beam S resting on the lower channel s' and strengthening and rigidifying the girder. A stationary axle V is mounted in holes in these plates U in the center of the girder, and carries the sheaves N which turn thereon. On the plates U also rest a pair of short channels W which rotatably support the equalizer-sheave O in like manner.

It will be observed that, while the central opening in the girder S is not triangularly braced, there will be, theoretically at least, no distorting force (that is no bending stresses upon the channels s' and s^2) since the loads upon the sheaves N are necessarily equal and they are equidistant from the center of support. But aside from this fact any slight inequality of loading which might exist would be amply resisted by the bending strength of the channels s' and s^2.

It will be readily understood by those skilled in the art that certain changes and modifications of construction may be made without departing from the spirit of my invention which in its due scope is expressed in the following claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a hoisting device, a girder composed of a pair of top and bottom members, and four web-plates flanking said top and bottom members and extending from the ends of said girder to points equidistant from the center.

2. In a hoisting device, a girder composed of a pair of top and bottom members and four web-plates flanking said top and bottom members and extending from the ends of said girder to points equidistant from the center, and load supporting means applied at and in the center of said girder, leaving an open space in the center.

3. In a hoisting-device, a girder composed of a pair of top and bottom members and four web-plates flanking said top and bottom members and extending from the ends of said girder to points equidistant from the center, and one or more sheaves in the opening at the center of said girder.

4. In a hoisting device, a girder composed of a pair of top and bottom members and four web-plates flanking said top and bottom members and extending from the ends of said girder to points equidistant from the center, an axle mounted longitudinally in the center of said girder, and sheaves turning on said axle.

5. In a hoisting device, a girder composed of a pair of top and bottom members and four web-plates flanking said top and bottom members and extending from the ends of said girder to points equidistant from the center, an axle mounted longitudinally in the center of said girder, and a pair of sheaves turning on said axle equidistant from the center of said girder.

6. In a hoisting device, a girder composed of a pair of top and bottom members and four web-plates flanking said top and bottom members and extending from the ends of said girder to points equidistant from the center, a pair of plates set transversely in the opening of said girder, an axle mounted on said plates longitudnally within said girder, and a sheave mounted on said axle.

7. In a hoisting device, a girder composed of a pair of top and bottom members and four web-plates flanking said top and bottom members and extending from the ends of said girder to points equidistant from the center, a pair of plates set transversely in the opening of said girder, an axle mounted on said plates longitudinally within said girder, and a pair of sheaves turning on said axle equidistant from the center of the girder.

8. In a hoisting device, a girder composed of a pair of top and bottom members and four web-plates flanking said top and bottom members and extending from the ends of said girder to points equidistant from the center, a pair of transverse plates flanking the sides of the central opening of said girder and extending from top to bottom and from side to side of said opening; an axle mounted between said plates longitudinally in the center of said girder, and a sheave mounted on said axle.

9. In a hoisting device, a girder composed of a pair of top and bottom members and four web-plates flanking said top and bottom members and extending from the ends of said girder to points equidistant from the center, a pair of transverse plates flanking the sides of the central opening of said girder and extending from top to bottom and from side to side of said opening; an axle mounted between said plates longitudinally in the center of said girder, and a pair of sheaves journaled on said axle equidistant from the center of said girder.

10. In a hoisting device, a girder having top and bottom channels laid horizontally, four web-plates flanking said channels and secured to the ends thereof, said web-plates extending from the ends of said girder to points equidistant from the center, and one or more sheaves rotatably mounted in the central opening of said girder between said web-plates.

11. In a hoisting device, a girder consisting of top and bottom members, one of which is bowed away from the other, four web-plates extending from the ends to points equidistant from the center and secured to said top and bottom members, and a sheave mounted to rotate in the central opening of said girder left by said web-plates.

12. In a hoisting device, a girder formed

of two horizontal channels united by lateral web-plates.

13. In a crane, the combination of a trolley-frame, a beam supported thereby and having a central opening, and one or more rope-sheaves mounted to rotate in said central opening in planes transverse to the axis of said beam.

14. In a crane, in combination with a trolley-frame, a box-girder comprising horizontal members united on their side-edges by vertical web-plates extending to points substantially equidistant from the center, and one or more rope-sheaves mounted in the central opening between said web-plates.

15. In a crane, in combination with a trolley-frame, a box-girder comprising horizontal members united on their side-edges by vertical web-plates extending to points substantially equidistant from the center, and a pair of rope-sheaves mounted to rotate in the central opening of said girder in planes transverse to the axis thereof.

16. In a crane, in combination with a trolley-frame, a box-girder comprising horizontal members united on their side-edges by vertical web-plates extending to points substantially equi-distant from the center, a pair of plates extending transversely across the central opening between said web-plates and closing the sides of said central opening, an axle mounted longitudinally on said plates in said central opening, and a pair of rope-sheaves journaled on said axle.

17. In a crane, in combination with a trolley-frame, a box-girder comprising horizontal members united on their side-edges by vertical web-plates extending to points substantially equidistant from the center, a beam parallel to said girder, a pair of plates transversely connecting said beam and girder and passing through the central opening in the latter and flanking the sides thereof, an axle mounted on said plates in the center of said girder, and one or more rope-sheaves mounted on said axle.

18. In a crane, in combination with a trolley-frame, a box-girder comprising horizontal members united on their side-edges by vertical web-plates extending to points substantially equidistant from the center, a beam parallel to said girder, a pair of plates transversely connecting said beam and girder and passing through the central opening in the latter and flanking the sides thereof, an axle mounted on said plates in the center of said girder, a pair of rope-sheaves mounted on said axle, and one or more additional sheaves supported by said plates externally to said girder.

19. In a crane, in combination with a trolley-frame, a box-girder comprising horizontal members united on their side-edges by vertical web-plates extending to points substantially equidistant from the center, a beam parallel to said girder, a pair of plates transversely connecting said beam and girder and passing through the central opening in the latter and flanking the sides thereof, an axle mounted on said plates in the center of said girder, a pair of rope sheaves mounted on said axle, and an equalizing sheave mounted in a plane parallel to said girder and supported between said plates adjacent to said first-named sheaves.

In witness whereof, I have hereunto set my hand this 30th day of July, 1908.

HOMER W. ISRAEL.

Witnesses:
W. Clayton Lloyd,
G. W. Helmer.