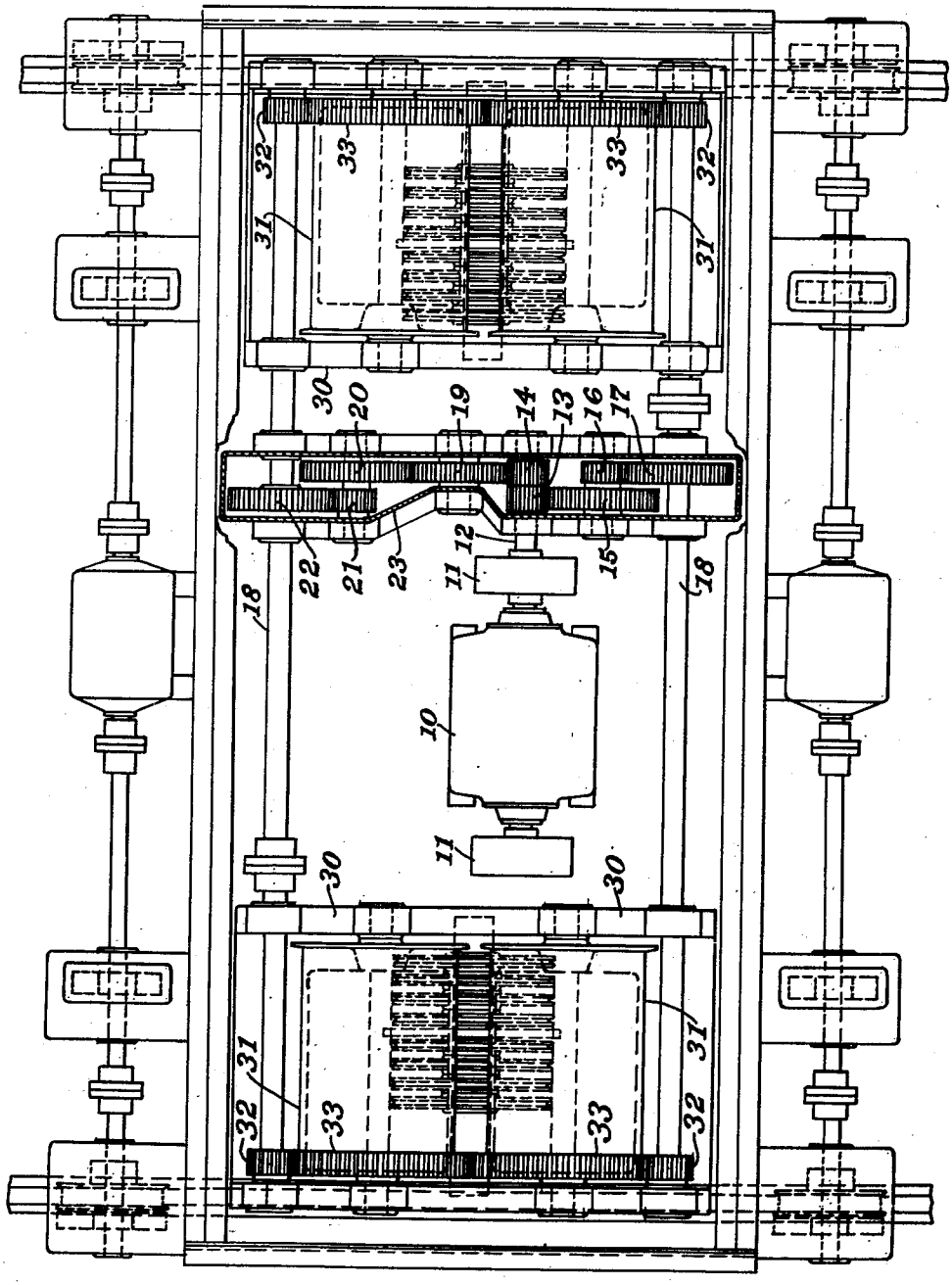
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HOIST CRANE CONSTRUCTION

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HOIST CRANE CONSTRUCTION

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12 Claims. (Cl. 254—184)

This invention pertains to a crane construction, and particularly, to operating mechanism for the hoist portions of a crane.

In my copending application Serial No. 250,579, filed January 12, 1939, and entitled "Hoist crane construction," I have shown a single motor having a pair of oppositely-extending armature shafts for suitably driving and operating hoist drums. In the present application, I have provided a mechanism for driving a pair of oppositely positioned drums in the desired manner employing only one end of the motor or armature shaft.

In the drawing:

The figure is a top plan view of a crane having a motor, drum and gear arrangement illustrating the present invention.

The frame structure is of any suitable type such as fully set forth in my copending applications.

The structure of the present invention has also been devised in such a manner that the advantageous features mentioned in the above copending application may also be embodied herein. That is, the location of the drum and motor constructions is such as to provide maximum of head room regardless of the capacity of size of the crane construction or the span of an auxiliary crane.

In carrying out the present invention, a drive motor 10 having suitable brake wheels 11 is provided with an armature shaft 12 having a pair of pinions 13 and 14 mounted thereon. The pinion 13 meshes with a spur gear 15 that drives pinion gear 16 that meshes with a spur gear 17 that is mounted on a transversely-extending drive shaft 18. The other pinion 14 meshes with an idle gear 19 that meshes with a spur gear 20 that drives a pinion gear 21 that meshes with a spur gear 22 that is mounted on an oppositely-positioned and transversely extending drive shaft 18.

The above-mentioned gear mechanism is constructed to reduce the speed of the motor 10 and to give the desired direction of rotation for both of the transversely-extending drive shafts 18; it is suitably journaled within a housing 23.

When I speak of the axis of the individual drums or the axes of the drum pairs or portions of the same, I have reference to the axis or axes about which the drum or drum pairs turn or rotate. The same is true as to shafting and other operating and drive connections and members including the motor armature or drive shaft as defined in the claims. When I speak of "interlocked drums" in the specification, I have reference to intermeshed or intermeshing drums which are provided with suitable means such as drum gears for, in effect, directly intergearing or locking them in such a manner that their operation is synchronized with separate actuating means.

Each drive shaft 18 at each end thereof is journaled within drum journal housings 30 of each pair of drums 31 and has a pinion 32 meshing with and driving a gear 33 of an adjacent hoist drum. In this manner, each drive shaft 18, as above explained, drives an oppositely-positioned drum of each pair, and each drum of each pair is directly interlocked with the other drum of the same pair while the single motor 10 drives the entire mechanism.

As shown in Figure 1, I have provided two pairs of hoist drums, one of which is mounted adjacent one side or end of the structure, while the other is mounted in a spaced-apart and substantially opposite relation with respect to the first-mentioned pair adjacent an opposite side or end of the crane structure. The drums of the spaced-apart drum pairs have a substantially end-to-end, axial-aligned, and offset relationship with respect to the drums of the other pair. It will thus be seen that the axes of one drum pair are, in effect, mounted or positioned forwardly in substantially the same plane of extension as the axes of the other pair.

The oppositely-positioned drums are connected together by a common drive shaft which may be termed a secondary drive shaft 18 which extends longitudinally of the hoist frame (or transversely of the main girders or of the movement of the trolley of the crane) to intermesh through spur gears with gears 33 interlocking one drum of each pair with the other drum of the same pair. In this manner, a substantially rectangular layout is provided, two sides of which are formed or bounded by end portions of the drum pairs and their axes, the other sides of which are bounded by the drive shafts 18 which extend across and intermesh with each of the drum gears 33 beyond outer peripheral or bounding portions of the drum pairs.

It will also be noted that the armature shaft 12 or what may be termed the primary drive shaft of the motor 10 is positioned within the space provided and bounded by the operating mechanism as above pointed out. The axis of this primary drive shaft 12 extends in the same direction, parallel to, and between the drum pairs as well as parallel to the secondary drive or connecting shafts 18. A double-acting spur gear ar-

rangement, whose axes also extend in the same direction as the drums, operably connects the primary or armature drive shaft to each of the secondary or connecting shafts 18. Thus, the drums of each pair are directly inter-geared and the drums of opposite pairs are connected through interconnecting shafts 18, and in this manner, synchronized in rotation with respect to each other and also with respect to the primary or motor drive shaft 12.

The drums of each pair are mounted with their peripheries and axes in a side-by-side relationship, while an associated sheave wheel is preferably positioned, as shown, beneath and in substantial alignment with the spacing between the drums of the pair. In like manner, portions of the interconnecting or secondary drive shafts 18 are operably positioned in a side-by-side relationship with respect to adjacent drums of the drum pairs. The secondary drive shafts 18 are positioned beyond or outside the peripheral limits of the drum pairs and are operably mounted in journal housings of the drum pairs as well as in the journal housing of the driving gear mechanism.

Although for the purpose of illustration I have shown a preferred form of my invention, it will appear to those skilled in the art that other suitable embodiments may be provided, and that many modifications, additions, and/or substitutions may be made without departing from the spirit and scope of the invention as indicated by the appended claims.

I claim:

1. A combination with a traveling hoist crane adapted to move longitudinally from one location to another and having a frame extending transversely of its direction of movement, spaced-apart pairs of hoist drums operably positioned at opposite sides of said frame, the drums of each pair having a portion of their axes in a side-by-side relationship, each drum of each pair having a gear intermeshing with a gear of the other drum of said pair, a motor on said frame in the spacing between said drum pairs, said motor being positioned adjacent end portions of said drums and having a rotating axis extending substantially in the same direction as the above-mentioned portion of the axes of said drums, the axes of said drums extending substantially transversely of the direction of travel of said crane, and means operably connecting said motor to each of said drums independently of the intermeshing relationship between the gears of said drums.

2. In a crane, a pair of hoisting drums, each drum having a gear secured thereto, said drums operably intermeshing through said gears and having a portion of their axes in a side-by-side relationship, another hoisting drum having a spaced-apart relation with respect to said pair of hoisting drums and having a portion of its axis extending in the same direction as the above-defined portion of the axes of said drum pair, a motor operably positioned substantially endwise of end portions of said drums and in the spacing therebetween, said motor having a rotating axis extending in substantially the same direction as the above-defined portions of the axes of said drums, and means operably connecting said motor to each of said drums.

3. In a crane, pairs of hoisting drums, each drum having a gear secured thereto, the drums of each pair being operably intermeshed with each other through said gears and having a portion of their axes in a side-by-side relationship, an actuating motor for said drums, said motor being positioned adjacent end portions of said drums and having a drive member extending in substantially the same direction as the above-defined portion of the drum axes, and means operably connecting the drive member of said motor to each drum of said drum pairs for actuating them, said means being independent of the intermeshed relationship between the drum gears of each pair.

4. In combination with a traveling hoist crane adapted to move longitudinally from one location to another and having a frame extending transversely of its direction of movement, spaced-apart pairs of hoist drums operably positioned at opposite sides of said frame, the drums of each pair having a portion of their axes in a side-by-side relationship, each drum of each pair having a gear intermeshing with a gear of the other drum of the same pair, a motor on said frame in the spacing between said drum pairs, said motor being positioned adjacent end portions of said drums and having a drive member extending substantially in the same direction as the above-mentioned portion of the axes of said drums, the axes of said drums extending substantially transversely of the direction of travel of said crane, connecting members extending transversely of the direction of travel of said crane across the spacing between said drum pairs and operably connecting each drum of each pair with an opposite drum of the other pair, and gear means operably connecting said drive member to each of said connecting members in such a manner as to drive them in opposite directions with respect to each other.

5. In a combination as defined in claim 4 wherein said gear means comprises spur gears positioned in a substantially end-to-end relationship with respect to said drums, and said spur gears being operably positioned to extend substantially longitudinally to the direction of movement of said frame between said connecting members.

6. In a crane, spaced-apart pairs of hoisting drums, each drum having a gear secured thereto, the drums of each drum pair being operably intermeshed through said gears and having a portion of their axes in a side-by-side relationship, an actuating motor for said drums positioned in the spacing between said drum pairs adjacent end portions of said drums and having a rotating axis extending substantially in the same direction as the above-mentioned portion of the axes of said drums, and means operably connecting said motor to each drum of each drum pair, said means being independent of the intermeshed relationship between said drum pairs and including means for operably and separately connecting each drum of each pair to a separate drum of the other pair.

7. In a crane, spaced-apart pairs of hoisting drums, each drum of each pair being operably intermeshed with the other drum of the same pair, the drums of each pair having a portion of their axes in a side-by-side relationship, an actuating motor positioned adjacent end portions of said drums and having a drive member extending substantially in the same direction as the above-defined portion of the axes of said drums, said motor also being positioned in the spacing between said drum pairs, and means operably connecting said motor drive member adjacent one end thereof to each drum of each

drum pair independently of the intermeshed relationship between the drums of each pair.

8. In a crane, a pair of rotatable hoisting drums having a portion of their axes in a side-by-side relationship, each drum having a gear, said gears being operably intermeshed, an actuating motor for said drums, said motor being positioned substantially endwise with respect to end portions of said drum pair and between planes representing said drums in the direction of their axes of rotation, said motor having a rotating axis extending in substantially the same direction as the axes of rotation of said drums, connecting members, and gears exclusively of a spur gear type operably connecting said members together adjacent such an end of said drum pair, said spur gears operably connecting said motor to said members, each of said members being operably connected to each gear of each of said drums independently of the intermeshed relationship between said drum gears.

9. In a crane, a pair of rotatable hoisting drums having a portion of their axes in a side-by-side relationship, each drum having a gear, said gears being operably intermeshed, an actuating motor for said drums having a rotating axis extending in substantially the same direction as the axes of rotation of said drums, said motor being positioned substantially endwise with respect to end portions of said drum pair and between planes representing said drums in the direction of their axes of rotation, a pair of spaced members, means operably connecting one of said members to one of said drums, means operably connecting the other of said members to the other of said drums, and spur gears independent of said drum gears operably extending across the spacing between said members and operably connecting said members together, said gears having rotating axes extending in substantially the same direction as the axes of rotation of said drums, said spur gears being positioned substantially endwise with respect to end portions of said drum pair and between planes representing said drums in the direction of their axes of rotation, said gears also operably connecting said motor to said members for actuating each of said drums independently of the intermeshed relationship between said drum gears.

10. In a crane, a pair of rotatable hoisting drums having a portion of their axes in a side-by-side relationship, each drum having a gear, said gears being operably intermeshed, an actuating motor for said drums, said motor having a drive member extending in substantially the same direction as the axes of rotation of said drums, said motor being positioned substantially endwise with respect to end portions of said drum pair and between planes representing said drums in the direction of their axes of rotation, a pair of spaced members, means operably connecting one of said members to one of said drums, means operably connecting the other of said members to the other of said drums, spur gear means on said motor drive member, spur gears operably connecting said drive member spur gear means to one of said spaced members, spur gears operably connecting said drive member spur gear means to the other spaced member, said spur gear means operably connecting the above-defined spur gears of each of said spaced members together for actuation by said motor, said spur gears being independent of said drum gears and being positioned substantially endwise with respect to end portions of said drum pair and between planes representing said drums in the direction of their axes of rotation, and said spaced members actuating each of said drums independently of the intermeshed relationship between said drum gears.

11. In a crane, spaced pairs of rotatable hoisting drums having a portion of their axes in a side-by-side relationship, each drum having a gear, the drums of each pair being operably intermeshed through said gears and having a portion of their axes in a side-by-side relationship, an actuating motor for said drums positioned between said drum pairs, said motor having a drive member extending in substantially the same direction as the axes of rotation of said drums, a pair of spaced actuating members, means operably connecting said members to oppositely-positioned drums of said drum pairs in such a manner that each drum of each pair will be actuated independently of the intermeshed relationship between the drums of said drum pairs, spur gears operably positioned in the spacing between drum pairs and across the spacing between said members, said spur gears connecting said members together and to said motor drive member for actuation thereby, the axes of rotation of said spur gears extending in substantially the same direction as the rotatable axes of said drums.

12. In a crane, a pair of hoisting drums, each drum having a gear secured thereto, said drums operably intermeshing through said gears and having a portion of their axes in a side-by-side relationship, another hoisting drum having a spaced-apart relation with respect to said pair of hoisting drums and having a portion of its axis extending in the same direction as the above-defined portion of the axes of said drum pair, a motor operably positioned in the spacing between said last-mentioned drum and said drum pair and having a drive member extending in substantially the same direction as the above-defined portions of the axes of said drums, means operably connecting said drive member to said additional drum and to each drum of said drum pair, said means being independent of the intermeshed relation between said drum pair and including means for operably and separately connecting each drum of said pair to said additional drum.

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