No. 620,088. Patented Feb. 21, 1899.

A. B. TENNEY.

TRAVELING CRANE.

(Application filed July 11, 1898.)

(No Model.) 2 Sheets—Sheet 1.

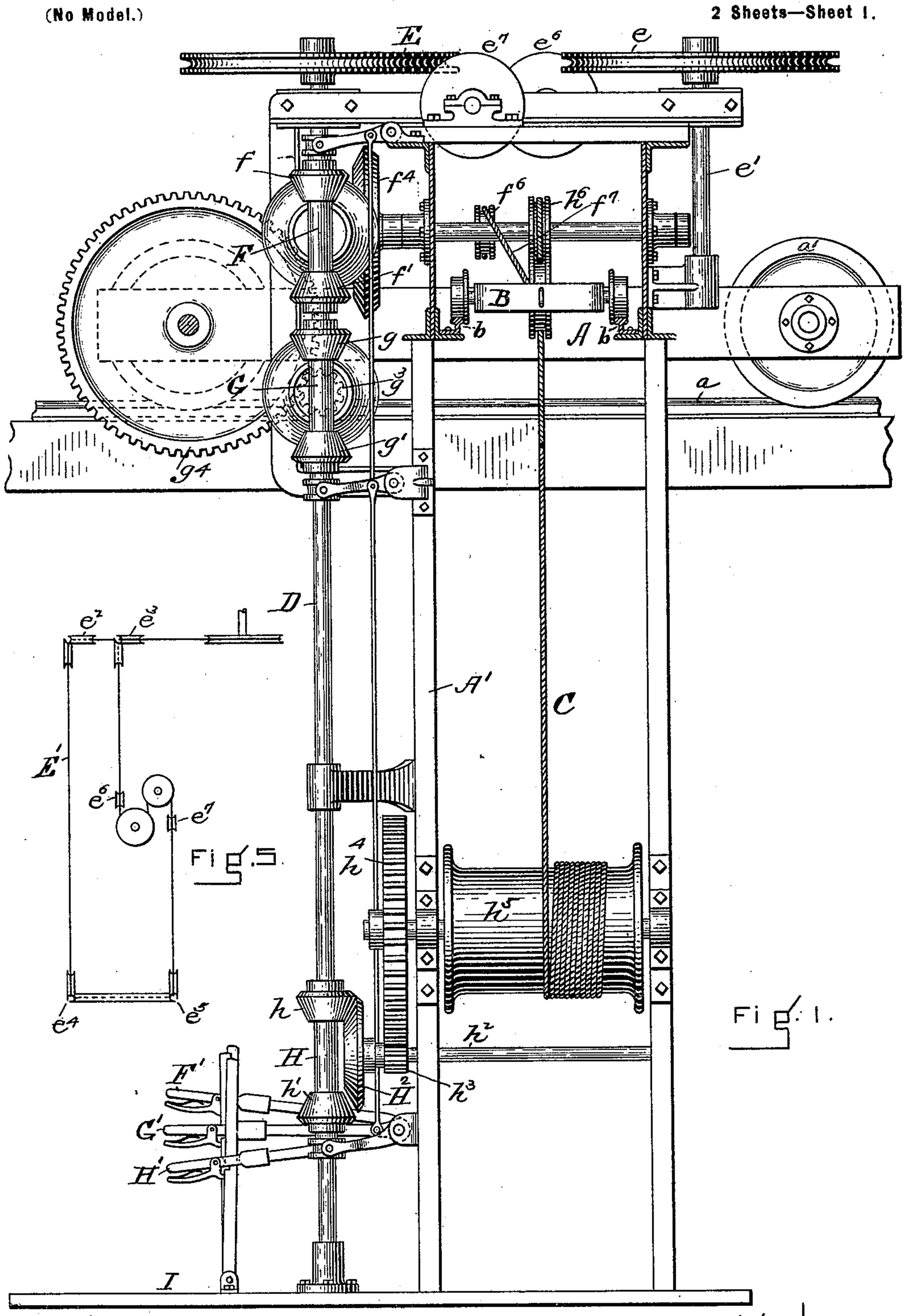

Fig. 5.

Fig. 1.

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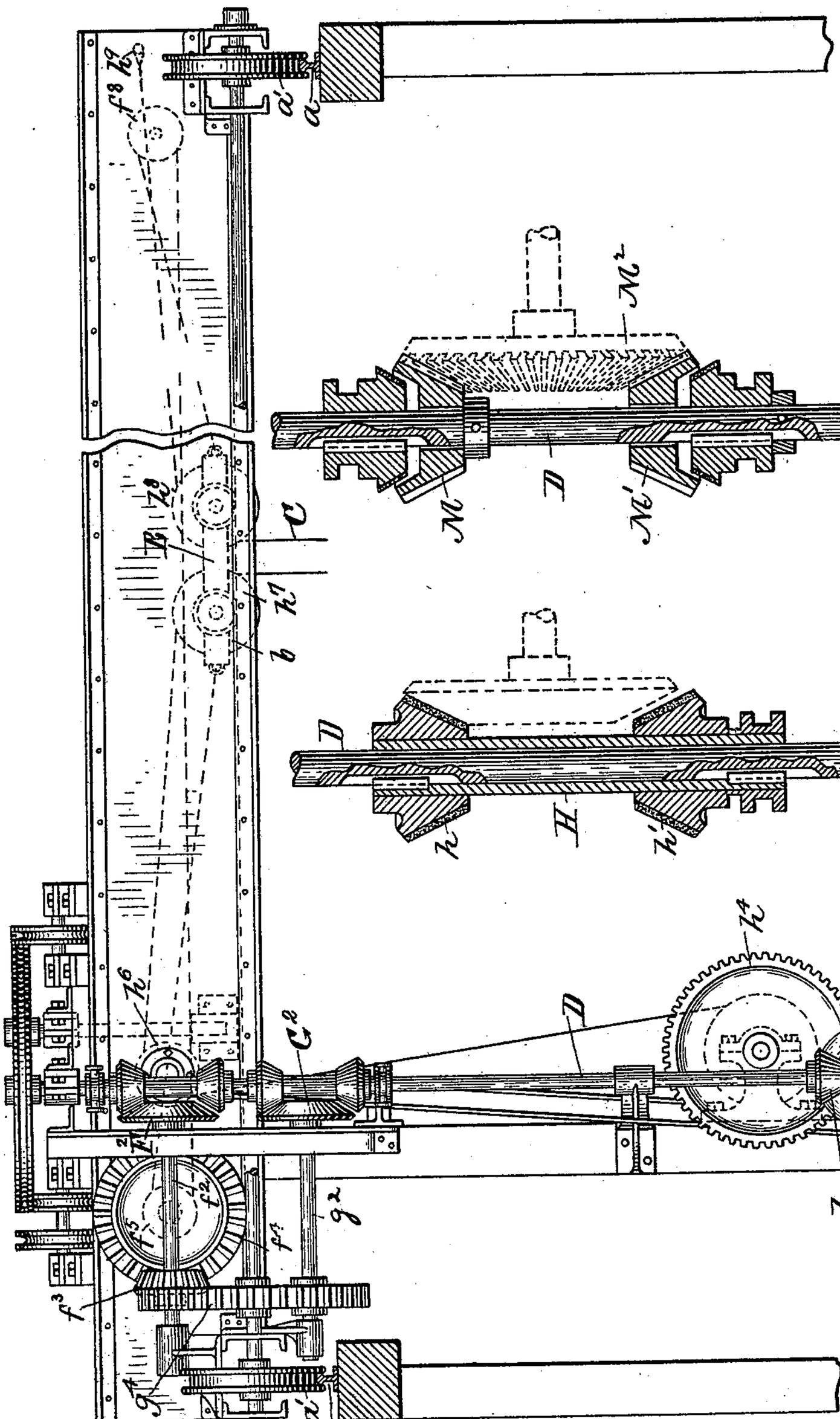

Fig. 4.

Fig. 3.

Fig. 2.

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UNITED STATES PATENT OFFICE.

ALBERT BALL TENNEY, OF EVERETT, MASSACHUSETTS.

TRAVELING CRANE.

SPECIFICATION forming part of Letters Patent No. 620,088, dated February 21, 1899.

Application filed July 11, 1898. Serial No. 685,634. (No model.)

To all whom it may concern:

Be it known that I, ALBERT BALL TENNEY, a citizen of the United States, residing at Everett, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Traveling Cranes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The invention relates to a traveling crane the various moving parts of which are adapted to be operated from a single vertical shaft carried by the crane, actuated by rope-transmitted power, and connected with shafts operating said moving parts by friction-clutches.

The object of the invention is to secure a construction of crane which shall be operated by rope transmission, be simple in construction, cheaply built, not liable to accident, and adapted to be run by an operator or workman traveling with the crane and of ordinary skill.

In the drawings, Figure 1 is a view of the crane principally in end elevation. Fig. 2 is a view of the crane principally in front elevation. Figs. 3 and 4 are detail views of connections between the vertical shaft and operative sections of the crane, to which reference will hereinafter be made. Fig. 5 is a plan view representing practically by diagram the relation of the operating-rope to the crane and its vertical shaft.

Referring to the drawings, A is the truck or framework of the traveling crane. It is of any desired form and is mounted in the usual way upon tracks *a* by its wheels or rolls *a'*. It has the boom or rails *b* extending across it from end to end in the usual manner, upon which the trolley B is movable backward and forward. It is propelled upon its tracks, the trolley is moved crosswise it, and its lifting and holding chain or cord C are all operated to be moved in either direction by the single vertical shaft D and interposed frictional clutches or connections hereinafter specified.

The employment of the vertical shaft permits, first, the rope transmission to be very simply and readily applied or attached to the crane, and, second, it permits direct application of power to the wheels or rolls *a'*, the trolley B, and the drum for winding the chain or cord C, and by very simple and direct means. The employment of frictional clutches connecting the vertical shaft with these means permits of the operation of the crane by ordinary hands, as it introduces a safety factor which is not obtained by positive clutching devices. It relieves the crane of strain because it permits the easy starting of the crane or the load as the clutches are manipulated by the operator and as there is always provision for the slip of the main shaft in respect to the connections. It further provides for cheapness of original construction, freedom from liability of expensive breakages, and relatively small cost for renewals.

The vertical shaft D has bearings in the crane and in a downward extension A' from one end thereof, which serves not only to support the vertical shaft and provide the lower bearings for it, but also carries the winding-drum, a platform for the operator, and a bank of levers or devices by which the friction-clutches are moved into and out of operative position and reversed. The vertical shaft has at its upper end a pulley E, which is fixed to it, and there is also carried by the crane in operative relation to said pulley a binder-wheel *e*, mounted on the upper end of the vertical shaft *e'*. The power-transmitting rope E' extends lengthwise the tracks *a* (see Fig. 5) and around suitable guiding and holding pulleys e^2 e^3 e^4 e^5, arranged at the two ends of the path of travel of the crane. One side of the traveling rope extends about the pulley E and binder *e*, (see Fig. 5,) and it is guided by guiding-sheaves e^6 e^7 to both, (see Figs. 1 and 5,) mounted on the crane. This rope causes the shaft D to be continuously rotated and also permits the shaft and its pulley to move lengthwise it as the crane is propelled by its propelling devices in one direction or the other.

The vertical shaft D has arranged upon it three reversing frictional clutches. Each of these clutch parts comprises two members or sections in opposed relation to each other, connected together to be simultaneously moved by an operating-lever, preferably adjacent to the platform and having frictional contact-

ing surfaces which are alternately or otherwise brought into contact with the frictional surface of the other part of each clutch. There is thus provided a connection between the vertical shaft and the devices which it operates in the nature of a frictional connecting and reversing clutch. In Figs. 1, 2, and 3 one form of this clutch is represented and in Fig. 4 another form. The parts of the clutch upon the vertical shaft of the construction of Figs. 1, 2, and 3 are lettered F G H. Each is in the form of a sleeve attached to the shaft by a spline or fast feather that it may be rotated by it and also be movable lengthwise it and having at each end wheels or disks having inclined or beveled surfaces in opposed relation to each other. The clutch part F has wheels with the clutch-surfaces f f', the clutch part G has wheels with the clutch-surfaces g g', and the clutch part H has wheels with the clutch-surfaces h h'.

The various clutch parts are movable lengthwise the shaft to bring one or the other of the clutch-surfaces into operative relation with the clutch-surfaces of the other parts of the clutches, hereinafter mentioned, by the levers F′ G′ H′, arranged as a bank near the lower end of the downward extension A′ of the crane and in proximity to the suspended platform I, upon which the operator stands. These operating-levers are connected with the said clutch parts by means of suitable connecting-rods and intermediate levers having forked ends arranged to engage by means of studs, pins, or rolls the grooved or recessed collars on the clutch parts.

The clutch-surfaces f f' actuate through the clutch part F^2 the winding-drum which moves the trolley B. This clutch part F^2 is upon the shaft f^2, and the said shaft has a bevel-gear f^3, which meshes with the bevel-gear f^4 at the end of the winding-drum shaft f^5 carrying the winding-drum f^6. The winding-drum is connected with the trolley in the usual way by means of a rope or chain f^7, one section of which extends directly from it to the trolley B and another section of which extends from the drum across the crane about a sheave f^8 upon the opposite end of the crane and returns to the end of the trolley nearest it, to which it is attached. The movement by the operator through the lever F′ of the clutch part F in a downward direction causes the clutch-surface f to be brought into engagement with the beveled or inclined clutch-surface of the clutch part f^2, when the winding-drum f^6 will be turned and the trolley and the load which it carries moved in one direction. The movement of the clutch part F in an opposite direction will cause the clutch-surface f to be removed from the clutch-surface of the part F^2, and its further movement will cause the clutch-surface f' of the part F to be brought into operative engagement with the clutch-surface of the part F^2, thereby reversing its rotation and causing the drum f^6 to be turned to move the trolley and its load in an opposite direction.

The clutch part G serves when brought into operative relation with the clutch part G^2 to propel the crane in one direction or the other, according as the clutch-surfaces g g' engage the bevel-surface of the part G^2. The said part G^2 is mounted upon the shaft g^2, which has upon it a pinion g^3, arranged to mesh with a gear-wheel g^4 on the axle carrying one pair of the crane-impelling rolls or wheels a'. The movement of the clutch part G in relation to the clutch part G^2 is like that of the clutch-part F and is accomplished by the lever G′ and need not further be described. The clutch part H on the vertical shaft D engages the clutch part H^2, which has an inclined or beveled frictional surface with which the surfaces h h' of the clutch part H are separately brought into contact. The clutch part H^2 is operated by the lever H′ in the manner of the clutch part F, and it is connected with the load lifting and carrying drum. It is mounted on a shaft h^2, which has a pinion h^3, meshing with a gear h^4 on the winding-drum h^5. This drum has an axle or trunnions supported by the downward extension A′ of the crane, and it has attached to it a lifting and carrying cord or chain C, which extends from it upward to the sheave h^6, carried by the crane, then over a roll h^7 on the trolley downward to a block and hook, (not shown,) thence upward to a roll h^8 on the trolley, and thence to the point h^9 on the crane, where it is made fast.

Ordinarily the levers F′ G′ H′ are held latched in a position which holds their clutched parts F G H in an inoperative position in respect to the clutch parts F^2 G^2 H^2, and ordinarily the weight of a lever when released and dropped will be sufficient to maintain the clutch part which it operates in operative contact with the clutch part with which the said first-named part is moved into contact. To obtain a reversal of the movement, the lever is lifted, and the operator then holds it lifted to maintain a clutching engagement of the other clutching-surface. The extent or degree of clutching contact may be varied by the amount of stress or pressure which the operator communicates through its moving lever, and it thereby becomes possible to easily vary or graduate the starting of the trolley or crane, as well as to increase or decrease the holding powers of the clutches, at the will of the operator.

In Fig. 4 I have represented a construction of clutch which I consider to be the mechanical equivalent of that of Figs. 1, 2, and 3. Instead of arranging the opposing frictional clutch-faces upon disks or wheels connected by a sleeve the wheels or disks are not connected by a sleeve, but are connected by the forked end of their moving lever, which is not shown, and these opposed frictional surfaces instead of making contact with a frictional-

surfaced disk or wheel, as in Fig. 3, make contact with the bevel-gears M M′, oppositely arranged to turn freely upon the shaft D and which mesh with the teeth of the gear M^2, which takes the place in location of the clutch members F^2 G^2 H^2, although the full equivalent of such member of the clutch is found in the bevel-gear M^2 and the bevel-gears M M′. It is desirable that the clutch parts upon the shaft D which are rotated with it be surfaced with a leather, paper, or other surfacing, but the part of the clutch with which they are brought into contact need be only of cast-iron.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a traveling crane adapted to be actuated by power transmission, the combination with a power-delivering rope arranged to deliver power to a vertical shaft carried by the crane of a traveling crane having a depending frame at one end, a vertical shaft mounted upon said crane and said frame, a rope-pulley thereon and a binder-wheel carried by the crane to hold the rope upon the pulley, a platform carried by said frame, a trolley mounted upon the crane to be movable lengthwise it, a winding-drum, a crane-propelling device and means connecting said vertical shaft with said trolley, winding-drum and propelling device adapted to be thrown into and out of connection with said vertical shaft at will, and a hoisting rope or chain C.

2. In a crane adapted to be operated by a traveling rope belt the combination of a crane having at one end a downward projection, a platform carried by said projection, a vertical shaft supported by the crane and its downward projection and actuated by said rope belt, a trolley movable lengthwise the crane, a winding-drum, and crane-propelling wheels, intermediate connecting devices between said vertical shaft and said trolley, drum and propelling wheels, reversing-clutches between said connecting devices, and said vertical shaft, and operating-levers arranged at or near said platform connected with said clutches, as and for the purposes set forth.

3. The combination in a traveling crane of a vertical shaft carried by the crane, a trolley mounted upon the crane to be movable upon it, a winding-drum and crane-propelling wheels, devices for actuating the trolley, the winding-drum and crane and reversible frictional clutch connections between the said devices and the said vertical shaft, as and for the purposes set forth.

4. The combination in a traveling crane of a vertical shaft carried by the crane, the trolley mounted upon the crane to be movable thereon, a reversible friction clutch member mounted upon said vertical shaft, a friction clutch member with which the reversible clutch member is adapted to be engaged, and mechanism connecting said member with the trolley.

5. The combination in a traveling crane of a suspended frame at one end thereof, a vertical power-shaft mounted upon said crane and said frame, crane-propelling wheels, a reversible friction clutch member mounted upon said vertical shaft, a friction clutch member with which the reversible friction clutch member is adapted to be engaged, and mechanism connecting said member with the crane-propelling wheels.

6. The combination in a traveling crane of a suspended frame at one end, a vertical shaft mounted upon said crane and said frame, a winding-drum, a reversible friction-clutch mounted upon said vertical shaft, a friction clutch member with which the reversible friction clutch member is adapted to be engaged, and mechanism connecting said member with the winding-drum.

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Witnesses:
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