

(No Model.)

T. JAMES.
MOTOR CONNECTION AND LOCK.

No. 501,904.

Patented July 18, 1893.

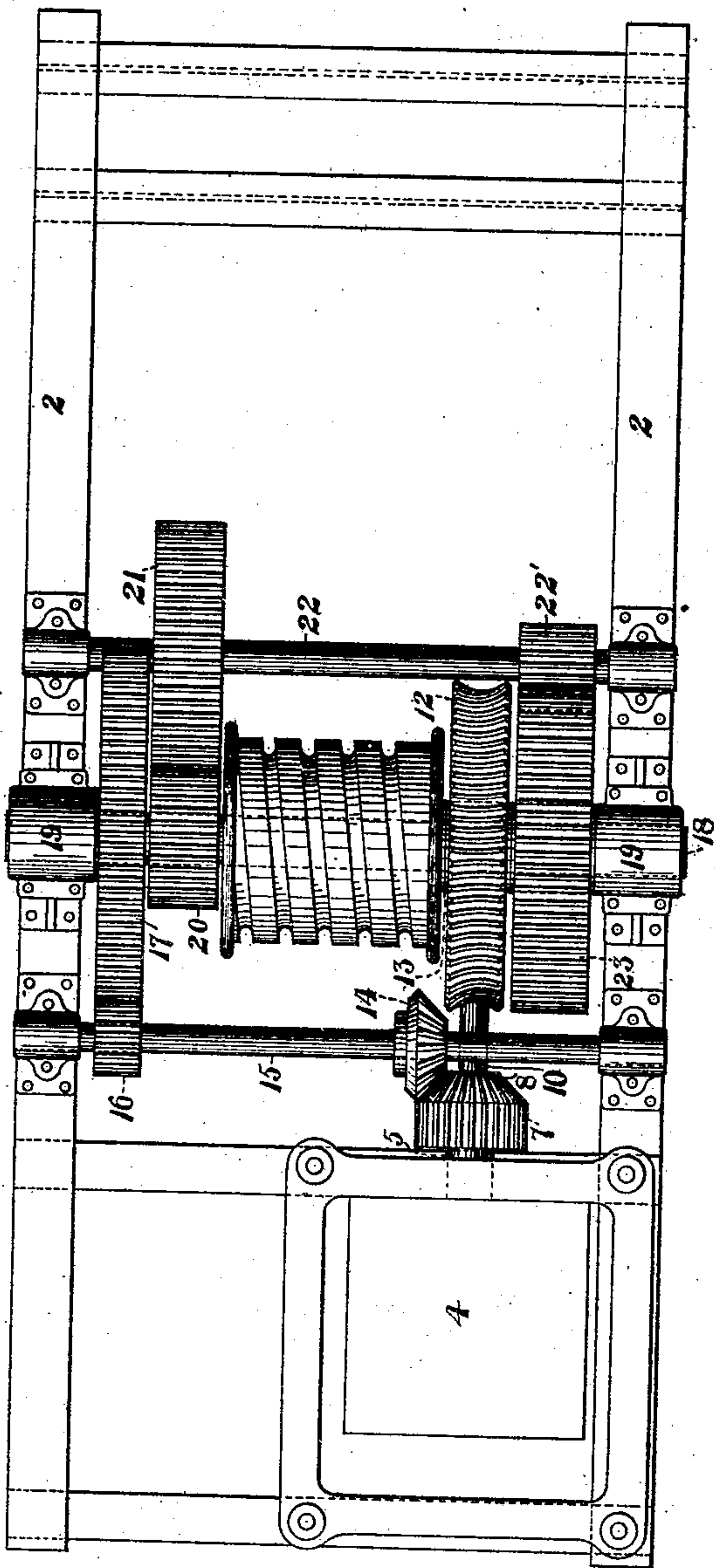


Fig. 1.

WITNESSES

A. M. Corwin
N. B. Corwin

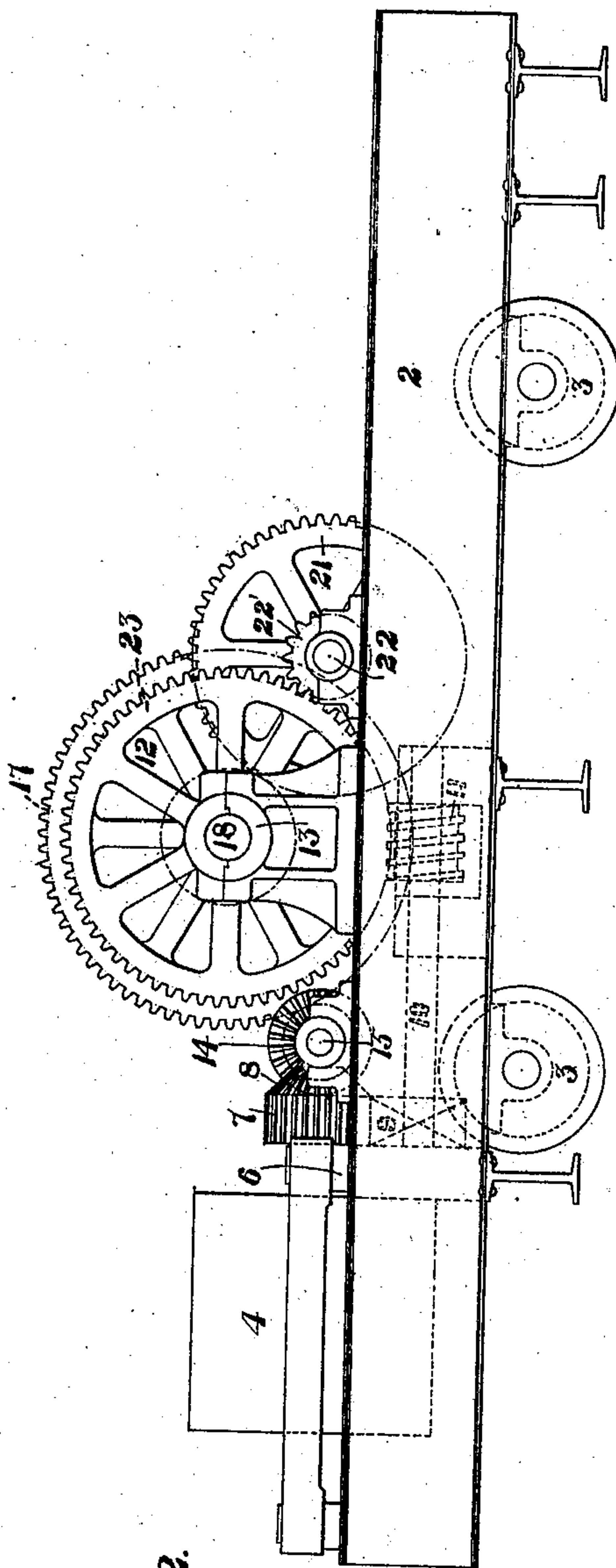


Fig. 2.

INVENTOR

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MOTOR CONNECTION AND LOCK.

SPECIFICATION forming part of Letters Patent No. 501,904, dated July 18, 1893.

Application filed May 11, 1892. Serial No. 432,672. (No model.)

To all whom it may concern:

Be it known that I, THOMAS JAMES, of Braddock, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Motor Connections and Locks Therefor, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a top plan view of a trolley for a hoisting crane, provided with my improved motor-connections; and Fig. 2 is a side elevation of the same.

My invention relates to the connections employed between power-driven shafts rotating at a high speed and shafts driven therefrom and arranged to rotate at a relatively low speed, and more particularly to the motor-connections employed upon hoisting cranes, and is designed to greatly lessen the wear upon the worm gearing at present employed therein, as well as to secure a more positive and certain action thereof.

To that end my invention consists of two sets of gearing connecting the driving to the driven shaft, one set being the ordinary worm or screw-gearing now employed, and the other a series of cog-wheels constituting a spur-gearing, the said spur gearing being arranged to work slightly in advance of the worm-gearing in one direction of rotation, while the worm-gear acts as a lock upon the spur gear and also as a positive actuating connection when the shaft is rotated in the opposite direction.

It also consists in the construction and arrangement of the parts as hereinafter more fully described and set forth in the claims.

In the drawings, in which like numerals indicate corresponding parts, 2 represents the frame of a trolley whose wheels 3, 3, are arranged to travel upon the jib of a crane in the ordinary manner. Upon this trolley is mounted a prime motor 4, in this case an electric motor, whose shaft 5 projects through the bearing 6 and carries a pinion 7 and bevel-wheel 8. A toothed wheel 9 engages the pinion 7 and is carried upon a shaft 10 bearing the screw or worm 11, which engages the worm-wheel 12 upon the hollow drum shaft 13. A bevel-wheel 14 meshes with bevel-wheel 8 and is carried upon a shaft 15 which bears a pinion 16 secured thereto. With the

pinion 16 gears a large toothed-wheel 17 secured to the shaft 18 passing through the hollow drum shaft and carried in bearings 19 upon the trolley-frame. Upon the shaft 18 is secured a pinion 20 intermeshing with toothed wheel 21 upon an auxiliary shaft 22 carrying a pinion 22' gearing with a toothed wheel 23 upon the hollow drum-shaft. A slow motion is thus imparted to the drum, its rate of speed corresponding to that derived through the worm-gear, while the motion in this direction is transmitted entirely through spur-gearing. The intermeshing wheels 7 and 9 are so arranged that there is a slight amount of lost motion therein. The effect of this is that when it is desired to lift a weight, motion is communicated to the drum shaft through the bevel-gearing and the intermediate spur-wheels and the worm gearing is not brought into action. When, however, the weight is lifted to the desired elevation and the motion of the motor-shaft is arrested, the weight starting to rotate the drum in the opposite direction, is held in its position by the worm-gearing, which thereby forms a lock for the drum. When the weight is to be lowered the motor shaft being rotated in the opposite direction, the wheels 7 and 9 directly engage each other and the motion passes through the worm-gearing. Under certain conditions as, for instance, when a weight is lifted and deposited upon a higher level, the worm-gearing acts as a positive means for the reverse rotation of the shaft as well as a lock therefor.

The advantages of my device are obvious. As the strain and wear in lifting are borne entirely by the system of spur gearing, no wear of the worm-gear is incurred, while the advantages of its use as a lock are retained. Moreover, the worm-gearing now employed absorbs about sixty or seventy per cent. of the power exerted thereon, only a small portion being usefully employed in lifting the load, whereas in my connection very little power is lost, the lifting motion being transmitted through the spur-gearing.

The connection is simple, positive in its actions, and not liable to get out of order, while the life of the device is much longer than of those now in use. I may employ an automatic clutch to engage and rotate the worm shaft after the engagement of the bevel gear-

ing, and many other arrangements of the spur and worm gearing may be employed without departing from my invention, which I regard as lying broadly in the connecting of two shafts by two sets of gearing, one a worm-gearing and the other a spur-gearing.

I claim as my invention—

1. A double connection between a driving and a driven shaft comprising a set of worm gearing and a set of spur-gearing, the one set of gearing being arranged to act when the other is inactive and each adapted to rotate the driven shaft at the same speed; substantially as and for the purposes described.

2. A double connection between an actuating and a driven shaft, comprising a set of worm-gearing and a set of spur-gearing, the spur-gearing arranged to form the actuating connection in one direction of rotation, and the worm-gearing as the actuating connection in the opposite direction of rotation and each adapted to rotate the driven shaft at the same speed; substantially as and for the purposes described.

3. A double connection between a driving and a driven shaft, comprising a set of worm-gearing having a slight amount of lost motion in its connection to the driving-shaft,

and a set of spur-gearing each adapted to rotate the driven shaft at the same speed; the spur-gearing forming the actuating connection when the worm-gearing is inactive, and vice versa, substantially as described.

4. A shaft having a pinion and a bevel-wheel thereon, a toothed wheel engaging the pinion and carried upon a shaft having a worm-gear connection with a winding shaft, a bevel wheel engaging the first named bevel-wheel, and connecting by a series of spur-gears with the winding shaft; substantially as described.

5. A shaft having a pinion and a bevel-wheel thereon, a toothed wheel engaging the pinion with a slight amount of lost motion therein and carried upon a shaft having a worm gear connection with a winding shaft, a bevel-wheel engaging the first named bevel-wheel, and connecting by a series of spur gears with the winding shaft; substantially as described.

In testimony whereof I have hereunto set my hand this 4th day of May, A. D. 1892.

THOMAS JAMES.

Witnesses:

W. B. CORWIN,
C. BYRNES.