

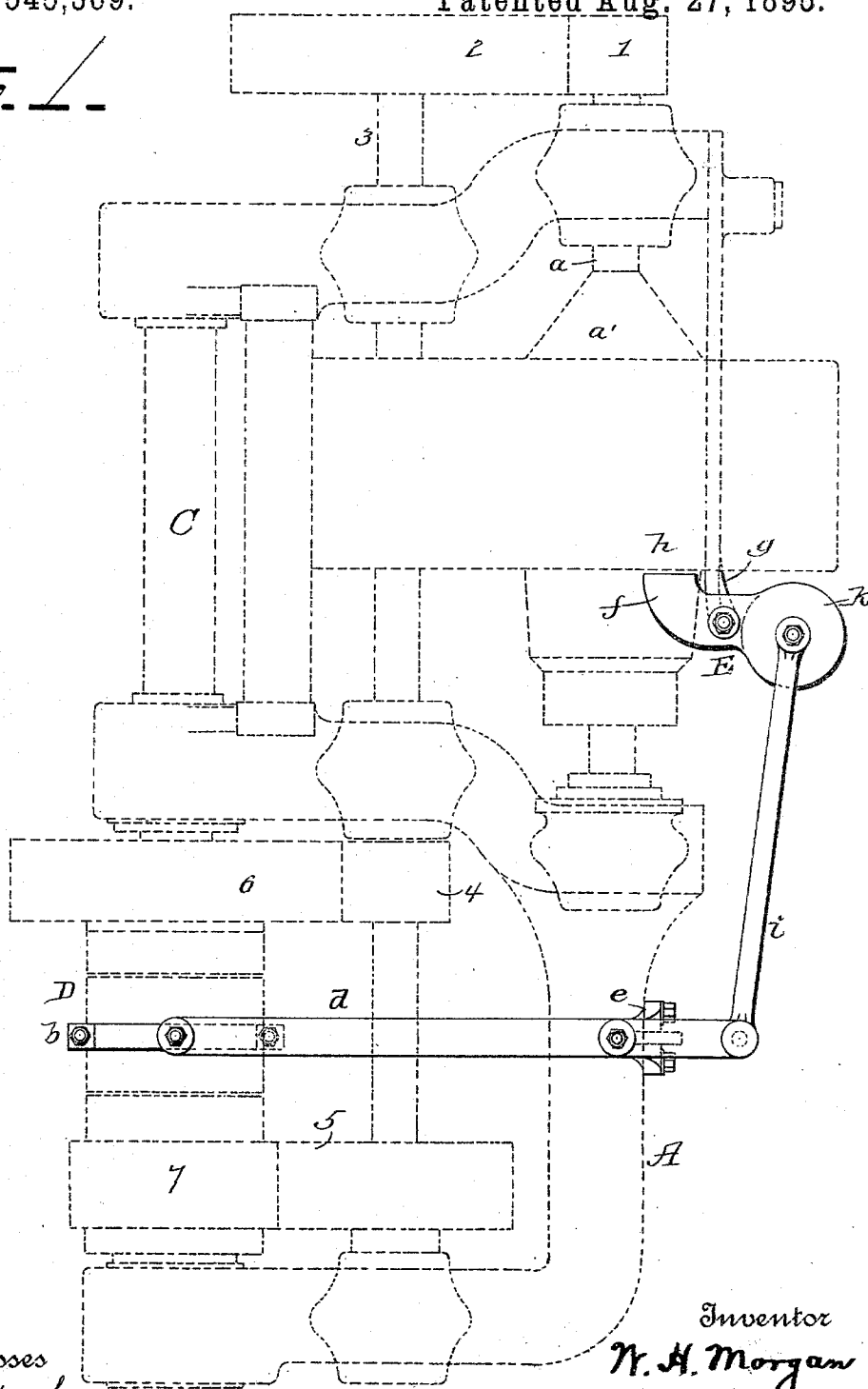
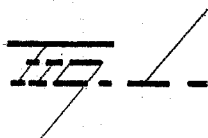
(No Model.)

2 Sheets—Sheet 1.

W. H. MORGAN.
CLUTCH OPERATING DEVICE.

No. 545,369.

Patented Aug. 27, 1895.



Witnesses
E. J. Nottingham
G. F. Downing.

Inventor
W. H. Morgan
By H. A. Seymour
Attorney

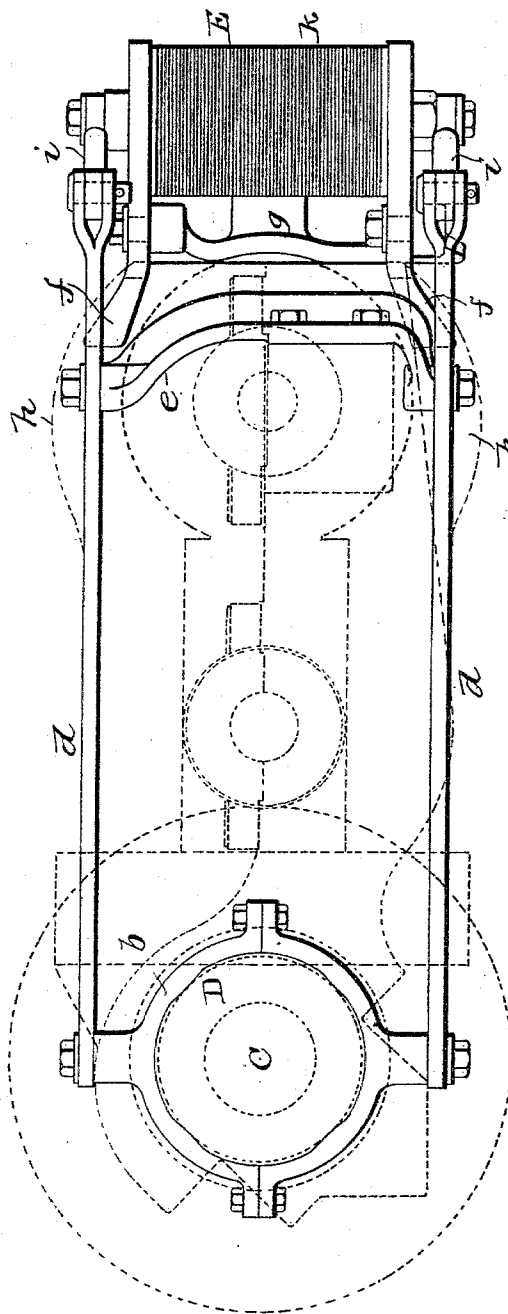
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UNITED STATES PATENT OFFICE.

WILLIAM HENRY MORGAN, OF ALLIANCE, OHIO, ASSIGNOR OF THREE-FOURTHS TO THOMAS R. MORGAN, SR., THOMAS R. MORGAN, JR., AND JOHN R. MORGAN, OF SAME PLACE.

CLUTCH-OPERATING DEVICE.

SPECIFICATION forming part of Letters Patent No. 545,369, dated August 27, 1895.

Application filed December 6, 1894. Serial No. 531,043. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HENRY MORGAN, a resident of Alliance, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Clutch-Operating Devices; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it ap-
10 pertains to make and use the same.

My invention relates to an improvement in clutches, and more particularly to means for operating such clutches as are employed in connection with traveling cranes. The over-
15 head traveling cranes now commonly employed for lifting and carrying heavy weights consist of a traveling bridge mounted at its ends on a suitable trackway and adapted to travel lengthwise the shop and a trolley
20 mounted on the bridge and adapted to travel lengthwise of said bridge, the trolley carrying the hoisting drums and chains. Some of these cranes are actuated by endless ropes, some by angular shafts, and others by steam-en-
25 gines and electric motors carried by the bridge. In most cases, so far as I am aware, the clutches on the movable trolley are actuated by mechanical devices mounted on the bridge, the most familiar form of clutch-oper-
30 ating device being an angular shaft adapted to be rocked by a lever passing through a sleeve carried by the trolley, the said sleeve being connected directly or indirectly to the clutch-operating yoke.

35 While my present invention is designed more particularly for electrically-operated cranes, it is evident that the clutch devices to be hereinafter described can be used in connection with machinery of any kind.

40 The object of my present invention is to produce simple and efficient means whereby the speed of the driven shaft can be changed by the operation of an electrical switch.

45 A further object is to so construct and arrange electrical clutch-operating devices that a portion of an electric motor can be utilized in the operation thereof.

50 With these objects in view the invention consists in the combination, with an electric machine, a driven shaft, and a clutch on the

driven shaft, of devices between said electric machine and clutch for operating the latter and an electric circuit, including a switch, for controlling the operation of said devices.

The invention also consists in the combina- 55 tion, with the field-magnets of an electric machine, a driven shaft, and a clutch on said shaft, of a pivoted armature to be acted upon by said field-magnets and connections between said armature and clutch. 60

The invention also consists in the combina- 60 tion, with the field-magnets of an electric machine and a clutch, of an electromagnetic armature to be acted upon by said field-magnets, connections between said armature and 65 the clutch, and an electric circuit, including the helix of said electromagnetic armature and a switch, whereby the polarity of said armature can be rendered the same as the 70 polarity of the adjacent field-magnet; and the invention also consists in certain novel features of construction and combinations and arrangements of parts, as hereinafter set forth, and pointed out in the claims.

In the accompanying drawings, Figure 1 is 75 a plan view illustrating my invention. Fig. 2 is an end view.

A represents a suitable framework in which an electric motor B is mounted, said frame being also constructed and adapted to receive 80 a power-shaft C, from which motion may be conveyed in any suitable or preferred manner.

The shaft *a* of the armature *a'* of the motor is provided with a small pinion 1, which meshes with and transmits motion to a large 85 gear-wheel 2, carried by a counter-shaft 3, which latter is mounted in the frame A. At the other end of the counter-shaft a pinion 4 and a gear-wheel 5 are fixed. The pinion 4 meshes with and transmits motion to a large 90 gear-wheel 6, mounted loosely on the power-shaft C, and the gear-wheel 5 meshes with and transmits motion to a gear-wheel 7, (preferably smaller than the gear-wheel 5,) mounted loosely on said power-shaft. Between these 95 gear-wheels a clutch D is located for locking one or the other gear-wheel 6 or 7 to the power-shaft. To the collar *b*, connected with the clutch, levers *d d* are pivotally connected, said levers being pivoted near their opposite 100

ends to a bracket *e*, secured to the framework A. In close proximity to the electric motor an electromagnetic armature E is located and made with two pole-pieces *ff*, said pole-pieces being pivotally connected at points between their ends to arms or brackets *g* projecting from the framework and adapted at their free ends to lie in close proximity to the field-magnets *h* of the motor, so as to be affected by the magnetism thereof in the manner hereinafter to be explained.

The electromagnetic armature E is connected with the short arms of the levers *d* by means of connecting-rods *i*, and the helix *k* of said electromagnetic armature is included in an electric circuit with a suitable switch, (not shown,) by means of which latter said armature can be energized or de-energized at will. The armature E is made of soft iron, so that when no current is passing through the coil or helix *k* said armature will not possess the properties of a magnet, and both pole-pieces of said armature will therefore be attracted by the field-magnets of the motor. When the armature E is thus attracted by the field-magnets of the motor, said armature will be turned on its fulcrum, which motion will be transmitted through the pitmen *j* to the levers *d* and the clutch D made to move on the shaft C, so as to lock the gear-wheel 6 to said shaft. As the large gear-wheel 6 receives its motion from the small pinion on the counter-shaft, a slow motion will be imparted to the power or driven shaft.

The electromagnetic armature is so wound and disposed that when it is energized its poles will be adjacent to like poles of the field-magnets of the motor. When the circuit through the helix of the armature is closed, the armature will be energized, and, as its poles are adjacent to like poles of the field-magnets, said armature will be repulsed, thus causing it to turn on its fulcrum in the reverse direction to that above described, thereby causing a reverse movement of the levers *d* and the clutch, which acts to free the gear-wheel 6 on the shaft C and lock the gear-wheel 7 to said shaft. As the gear-wheel 7 receives its motion from a larger gear-wheel on the counter-shaft, a fast motion will be imparted to the power-shaft.

From the construction and arrangement of parts above described it will be seen that in order to impart a fast or a slow motion to the driven or power shaft C it is simply necessary to manipulate the switch which is included in the circuit of the helix of the armature. When said switch is open, a slow motion will be imparted to the driven shaft, and when the switch is closed a fast motion will be imparted to said driven shaft.

My improvements are very simple in con-

struction, effectual in the performance of their functions, and can be easily manipulated by means of any suitable electrical switch located at any convenient point.

Various slight changes might be made in the details of construction of my invention without departing from the spirit thereof or limiting its scope, and hence I do not wish to limit myself to the precise details of construction herein set forth; but,

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

1. The combination with an electric motor, a driven shaft, and gearing between the armature shaft and the driven shaft, of a clutch on the driven shaft, an armature to be acted upon by the field magnet of the motor, and connections between said clutch and armature, substantially as set forth.

2. The combination with an electric motor and a shaft adapted to be driven by said motor, of an electro-magnetic armature adapted to be attracted and repelled alternately by the field magnet of the motor, a clutch on said shaft and a connection between said armature and the clutch, substantially as set forth.

3. The combination with an electric motor, a driven shaft, a clutch on the driven shaft and gearing between said driven shaft and motor, of a pivoted electro-magnetic armature adjacent to the field magnets and of a like polarity when energized to the field magnets, a pivotal lever connected with said clutch and a rod connecting the electro-magnetic armature with the pivoted lever, substantially as set forth.

4. The combination with an electric motor and a driven shaft, of a counter shaft adapted to receive motion from the shaft of the motor, a small and a large gear fixed to said counter shaft, a large and a smaller gear wheel loosely mounted on the driven shaft, said large gear meshing with the small gear on the counter-shaft and the smaller gear on the driven shaft meshing with the larger gear on the counter-shaft, a clutch between the loose gears on the driven shaft whereby to lock one or the other of said gears to the shaft, pivoted levers connected with said clutch, a pivoted electro-magnetic armature adapted to be acted upon by the field magnets of the motor, and rods connecting said electro-magnetic armature with said pivoted levers, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WILLIAM HENRY MORGAN.

Witnesses:

W. C. LLOYD,
E. WOOLGAR.