

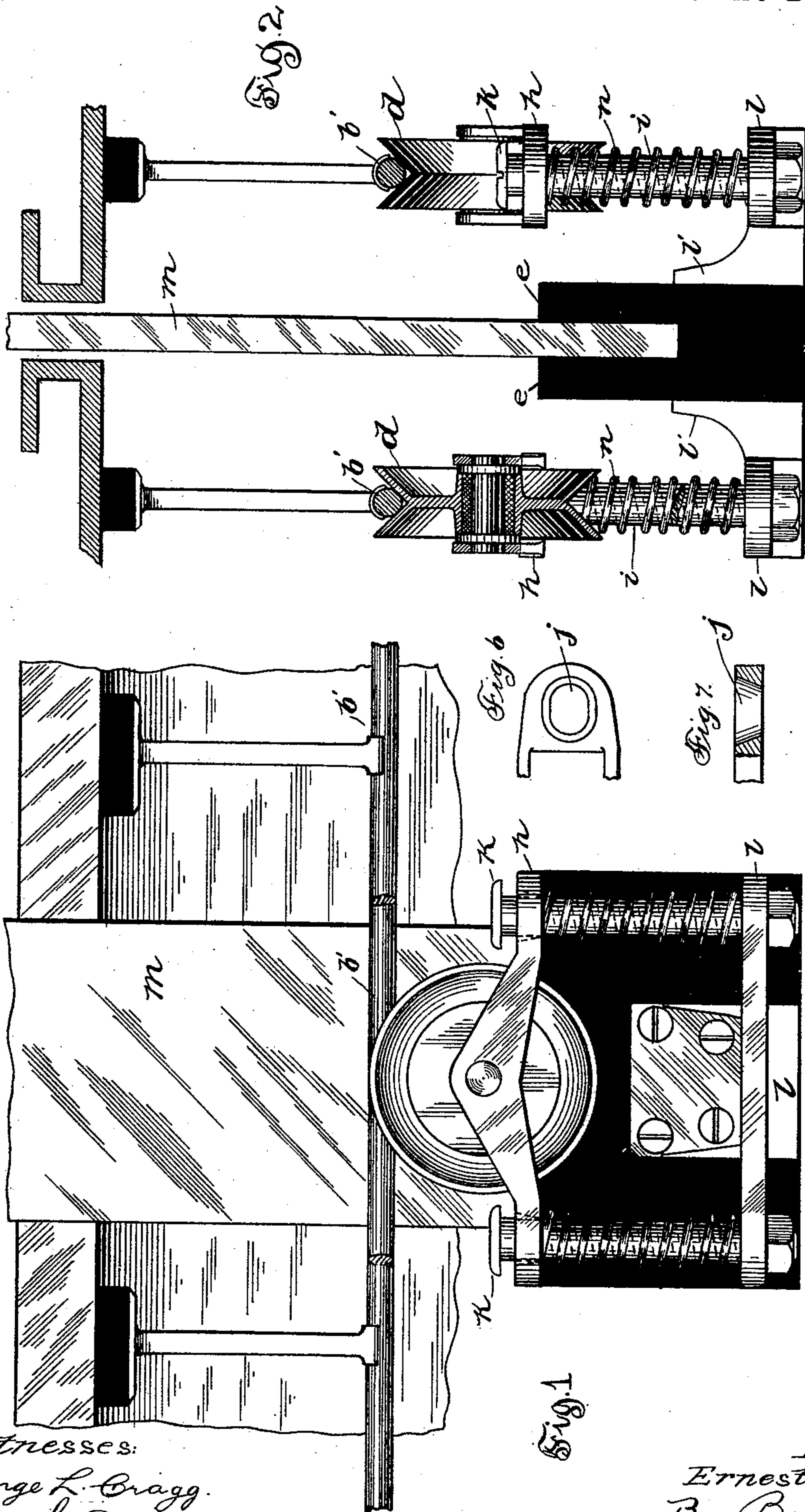
(No Model.)

3 Sheets—Sheet 1.

E. P. WARNER.
CONDUIT RAILWAY TROLLEY.

No. 500,306.

Patented June 27, 1893.



Witnesses:

George L. Bragg.
Heath L. Templeton

Inventor:
Ernest P. Warner
By Barton & Brown
Attys

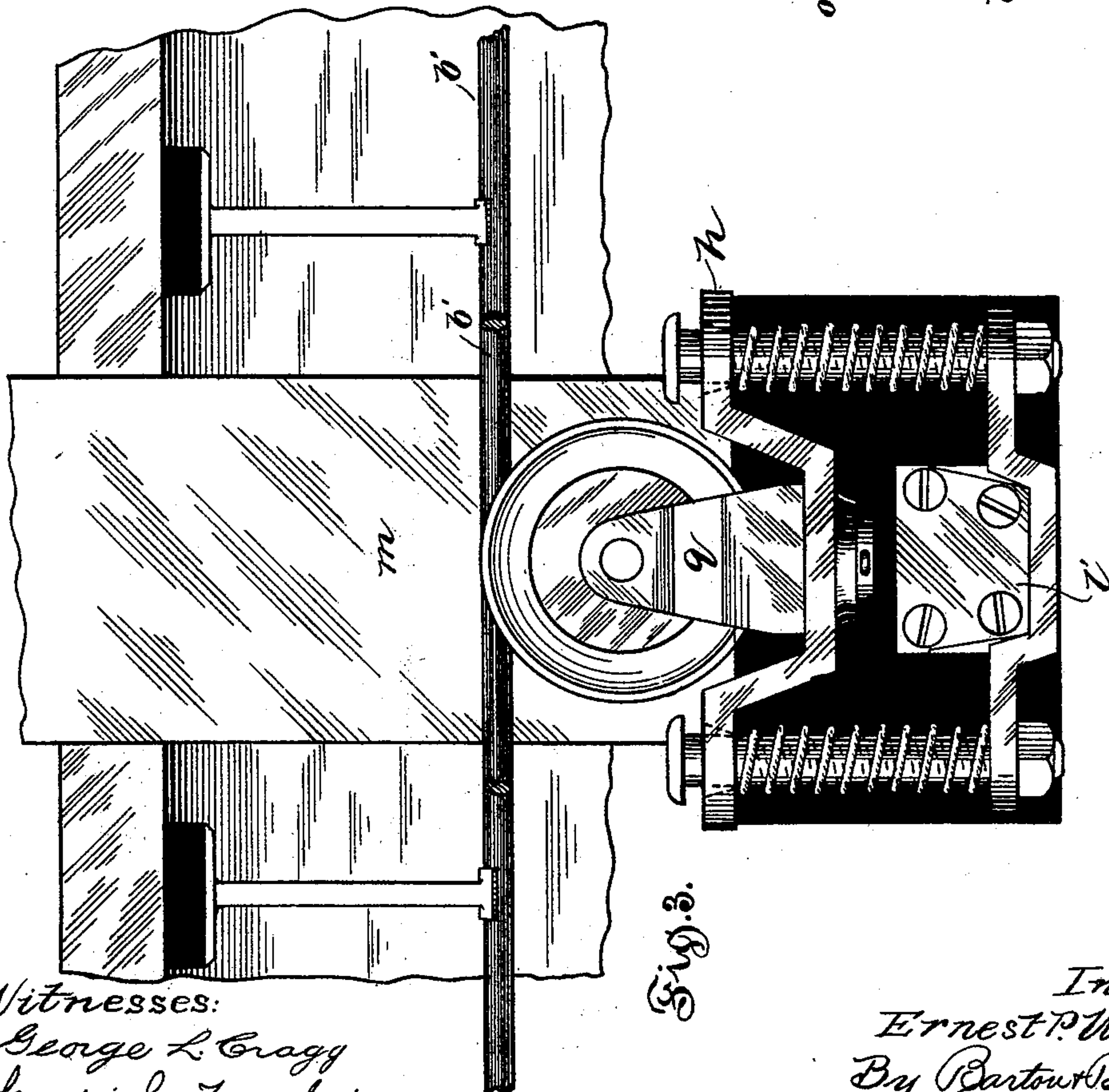
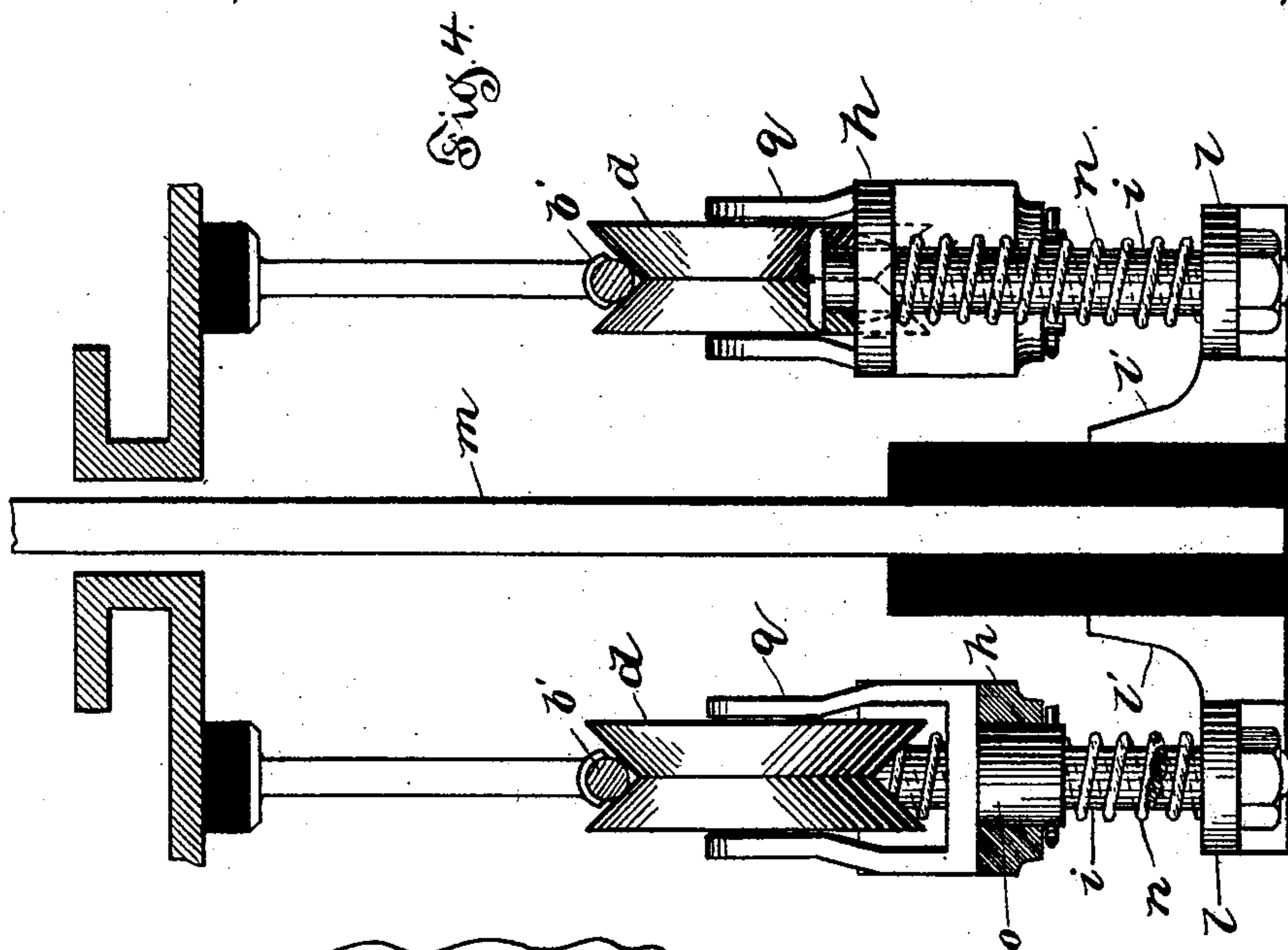
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No. 500,306.

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Witnesses:

George L. Cragg
Hattie L. Timplin

Inventor:
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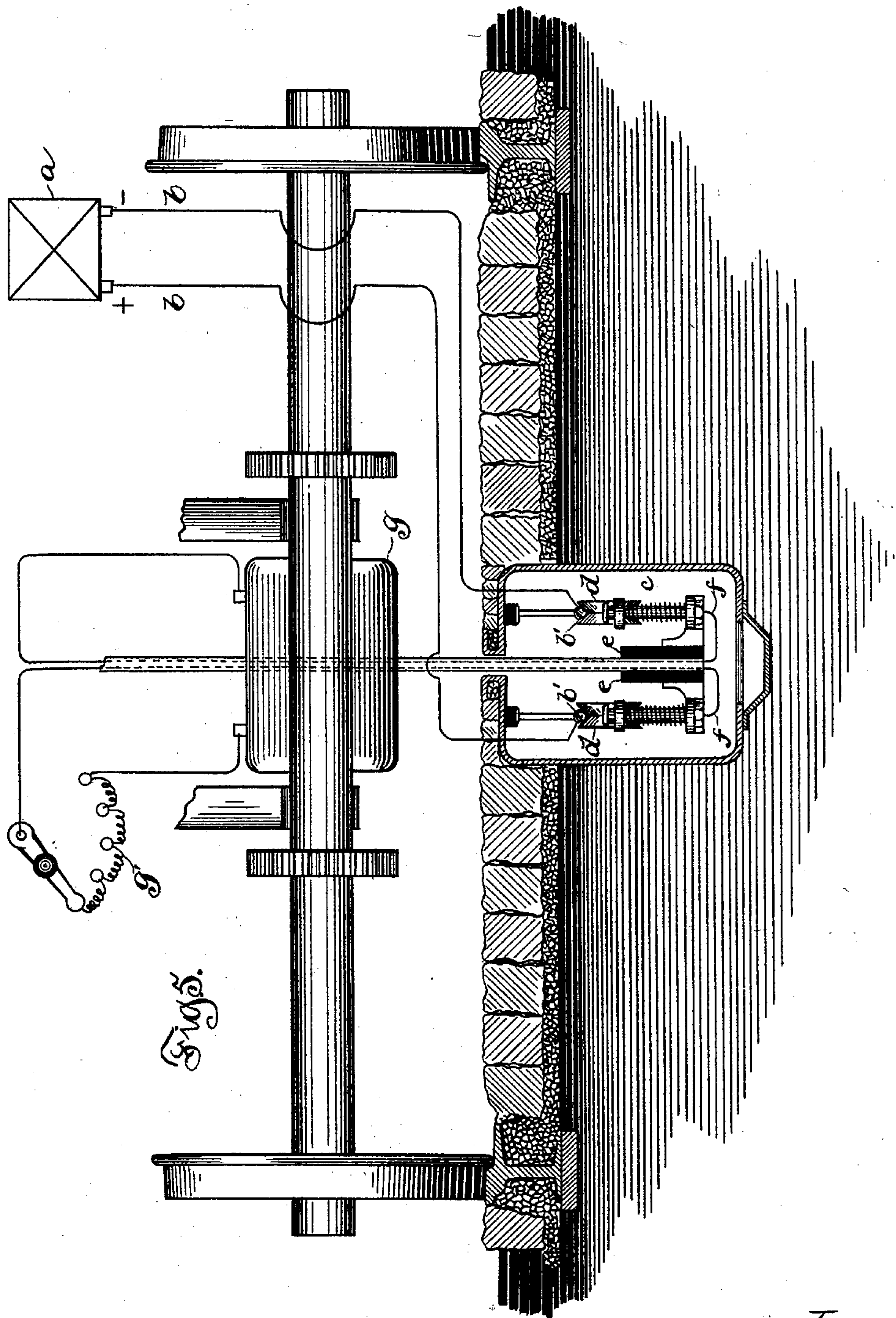
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UNITED STATES PATENT OFFICE.

ERNEST P. WARNER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WESTERN ELECTRIC COMPANY, OF ILLINOIS.

CONDUIT RAILWAY-TROLLEY.

SPECIFICATION forming part of Letters Patent No. 500,306, dated June 27, 1893.

Application filed July 30, 1892. Serial No. 441,686. (No model.)

To all whom it may concern:

Be it known that I, ERNEST P. WARNER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Trolleys, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to trolleys for electric railways, and more particularly to double trolleys for railways operated with underground electric conductors.

It is the object of this invention to provide a trolley which will be reversible, *i. e.*, will travel in either direction with equal facility and will make a firm contact with the trolley conductor, but at the same time adapt itself by a yielding support to such irregularities as exist in the position of the trolley wires with reference to the rails.

A further object of my invention is to provide a means of mounting double trolleys substantially upon a trolley arm.

My invention will be more clearly understood by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of the trolley. Fig. 2 is an end elevation of the trolleys showing one of the trolley wheels in section and one of the supports of said trolley partially removed. Fig. 3 is a side elevation of another form of trolley. Fig. 4 is an end elevation of the form of trolley shown in Fig. 3 with one of the supports of one of the trolley wheels partly removed, and the supporting yoke shown in cross-section. Fig. 5 is a section of the road bed showing the conduit in which the trolley conductors are suspended with an end view of the trolleys in contact therewith and supported upon a trolley arm which passes up through a slot in the top of the conduit and is carried by the car upon which is the motor. There is also represented in Fig. 5 a diagram of the connections with the generator. Figs. 6 and 7 show details of openings *j j*.

Similar letters of reference refer to similar parts throughout the different views.

The two main wires *b b* lead from the generator *a* to the trolley conductors which are

suspended in the conduit *c* in a position adapted to permit the trolley wheels *d d* to make an underrunning contact therewith. These trolleys are insulated from each other and from the standard which supports them both by the rubber blocks *e e*. From each trolley an electrical conductor *f f* leads to the motor upon the car, the rheostat *g'* being included in the circuit in the well known way and adapted to govern the current supplied to the said motor.

As the method of mounting the motor and connecting it in the electrical circuit and mechanically with the driving wheels of the car is not an essential part of my invention, I do not deem it necessary to describe these points in detail.

The trolley wheels are supported in bearings upon the yokes *h h*. The bolts *i i* pass through the yokes *h h* freely, the openings *j j* in said yokes being large enough to permit the heads *k k* of said bolts to pass. The openings *j j* are made oblong, the greatest length lying lengthwise of the yoke. The sides of the openings taper downward. The details of the openings are shown in Figs. 6 and 7. This construction permits a certain amount of lateral swing of the trolley wheel and yoke. The bolts *i i* are rigidly fastened to the bases *l l* which are carried by the brackets *l' l'* fastened to the rubber blocks *e e*, which in turn are attached to and carried by the trolley arm *m*. Surrounding the bolts *i i* and resting upon the bases *l l* are the spiral springs *n n* which press the yokes *h h* upward against the heads of bolts *i i*. These springs serve as the yielding supports for the trolley wheels and press the wheels continually into engagement with the trolley conductors *b' b'*. The openings in the yokes *h h*, through which pass the bolts *i i* are of sufficient size to permit the trolleys to accommodate themselves by leaning one side or the other slightly to any ordinary deviations in the lines of the slot and the trolley wires. It is obvious that this construction permits the trolley to travel in either direction with equal facility, the spring which happens to be the rear one in any case being more compressed than the forward spring.

The construction of the trolley shown in Figs. 3 and 4 adapts the trolley wheels to

swerve in a plane at right angles to their plane of rotation. This is accomplished by mounting the trolley wheels in forks *q q*, having a swivel bearing *o* at their lower extremities, 5 which swivel bearing is carried upon the yokes *h h*, the yoke being formed with a downward drop in the center to permit the use of this swivel mounting. This construction is advantageous for permitting the trolleys to follow the conductors on curves and at abrupt 10 angles.

As the method of making the electrical connection between the trolley wheels and the motor is not an essential part of my invention, 15 I do not describe it in detail.

What I claim as new, and desire to secure by Letters Patent, is—

1. A trolley consisting of a wheel with grooved periphery, in combination with a 20 yoke upon which said wheel is mounted, a yielding support at each end of said yoke, and a trolley arm carrying said trolley, substantially as described.

2. In a trolley, the combination with a trolley wheel, of a yoke upon which said trolley 25 wheel is mounted, a guiding stud at each end

of said yoke, a spring at each end of the yoke adapted to press said yoke upward, a base adapted to carry said spring and said stud and a trolley arm to which said base is at- 30 tached, substantially as described.

3. In a double trolley, the combination, with a trolley arm, of brackets *l' l'* insulated from each other, bases *ll* attached to said brackets, guiding studs *ii* mounted on said bases, yokes 35 *h h*, springs *n n* tending to press said yokes upward, and trolley wheels *d d* mounted on said yokes, substantially as described.

4. In a trolley, the combination, with a trolley wheel, of a fork within which said wheel 40 is supported, a yoke upon which said fork is pivotally mounted, a yielding support at each end of said yoke and a trolley arm adapted to carry said trolley, substantially as described. 45

In witness whereof I hereunto subscribe my name this 19th day of April, A. D. 1892.

ERNEST P. WARNER.

Witnesses:

M. JEANE TALLETS,
W. CLYDE JONES.