

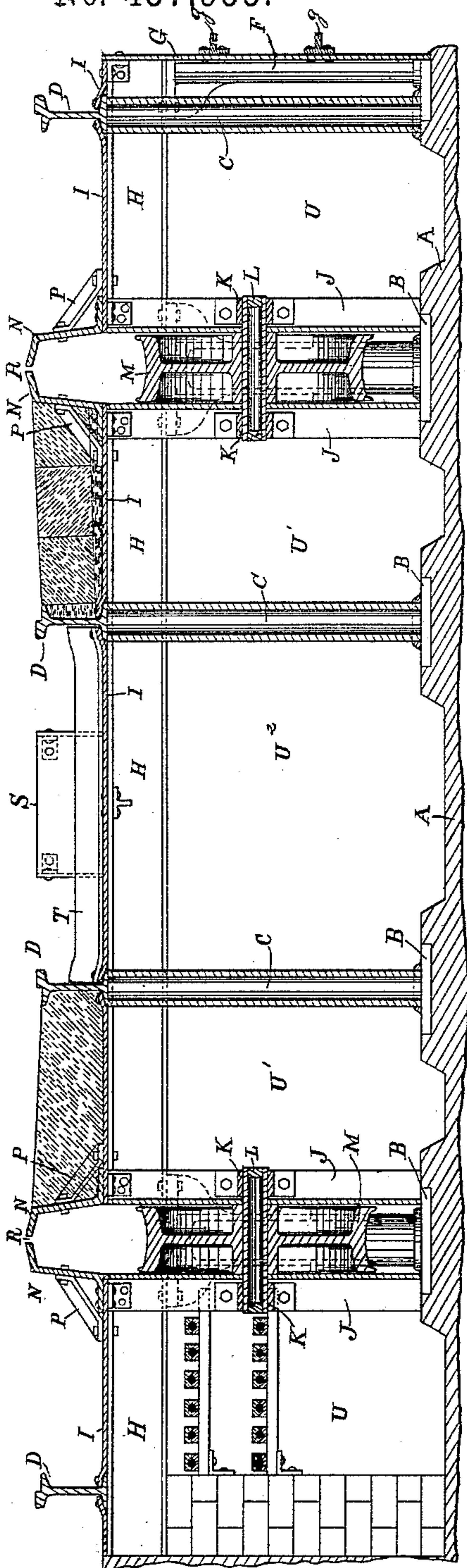
(No Model.)

3 Sheets—Sheet 1.

R. T. WHITE.  
CABLE RAILROAD AND CONDUIT.

No. 437,955.

Patented Oct. 7, 1890.



Witnesses.  
Edward Hobbs  
Geo. S. Tolman  
FIG. 1.

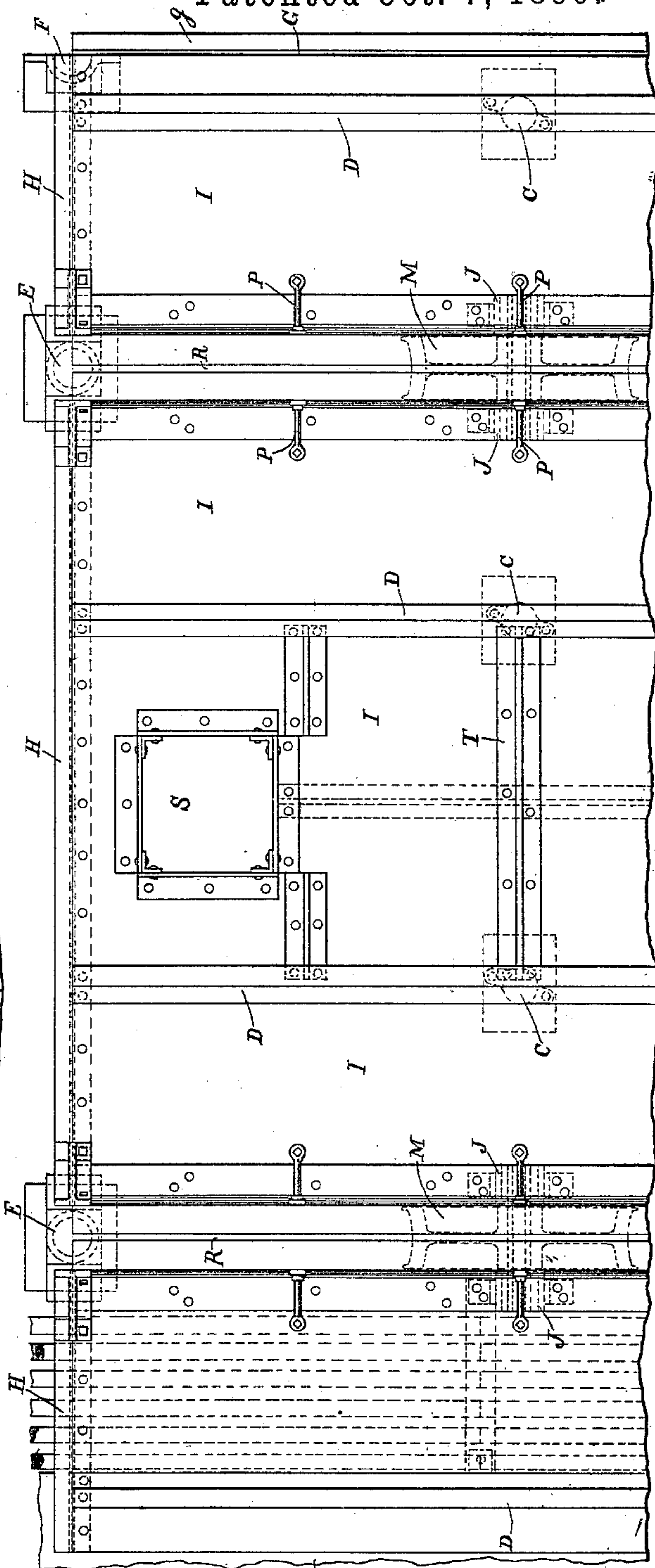


FIG. 2.

Inventor.

R. T. White

(No Model.)

3 Sheets—Sheet 2.

R. T. WHITE.  
CABLE RAILROAD AND CONDUIT.

No. 437,955.

Patented Oct. 7, 1890.

Fig. 2.

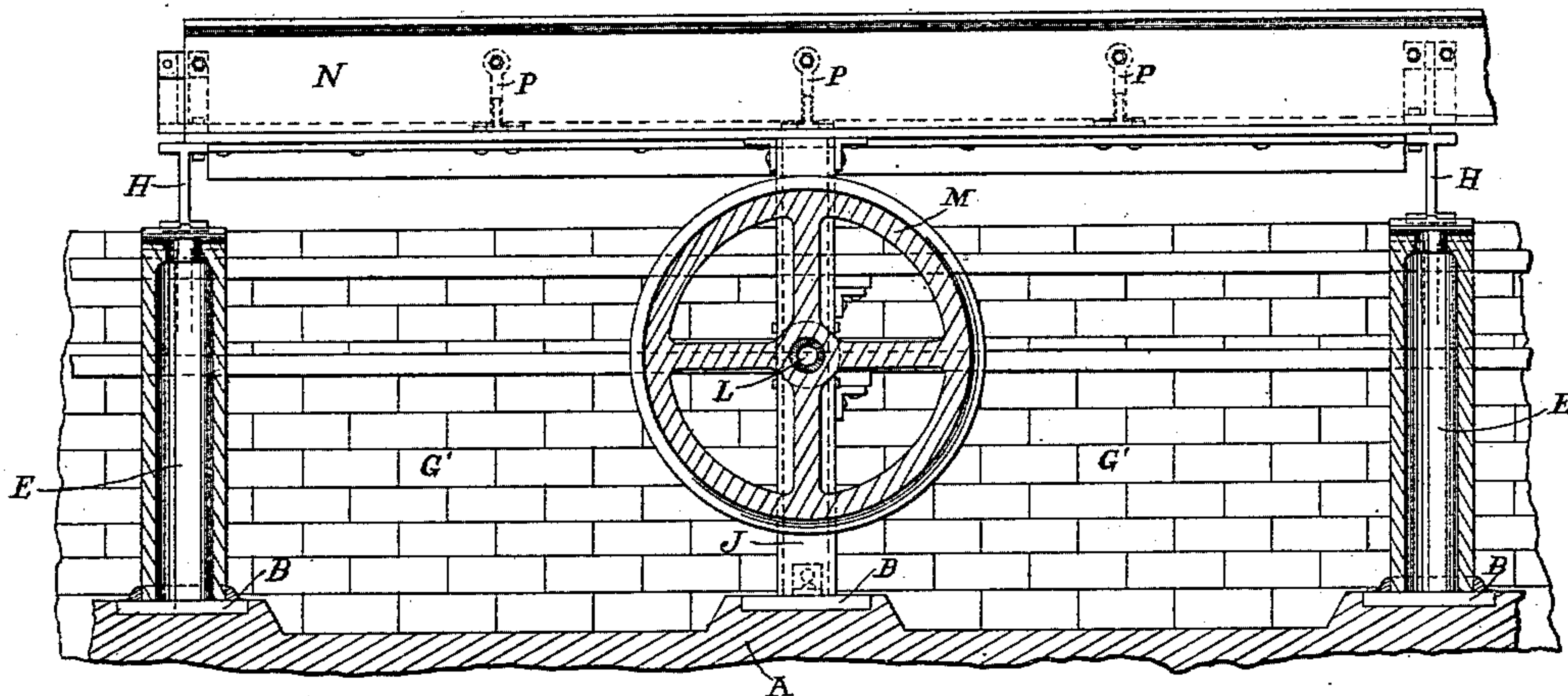


Fig. 4.

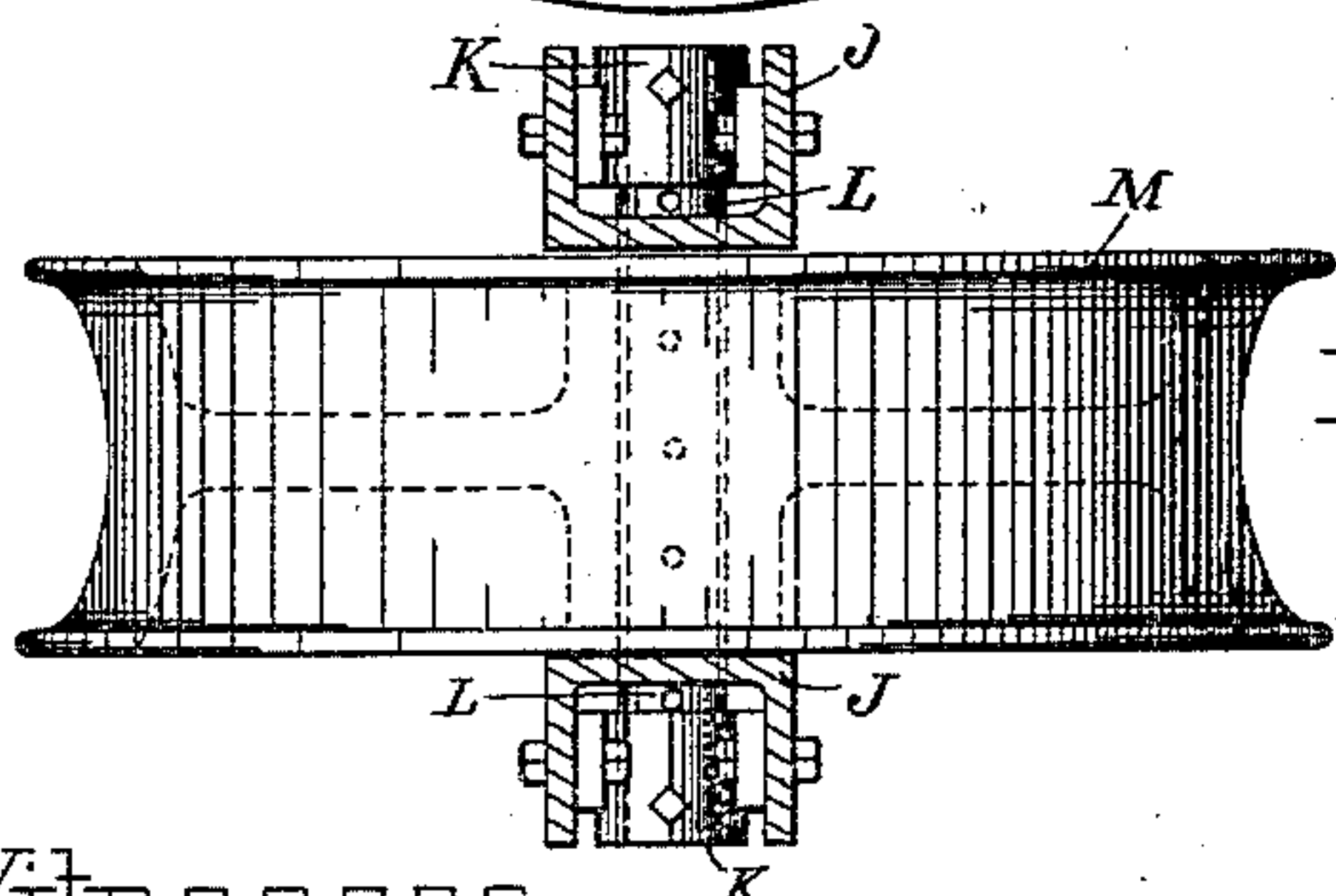
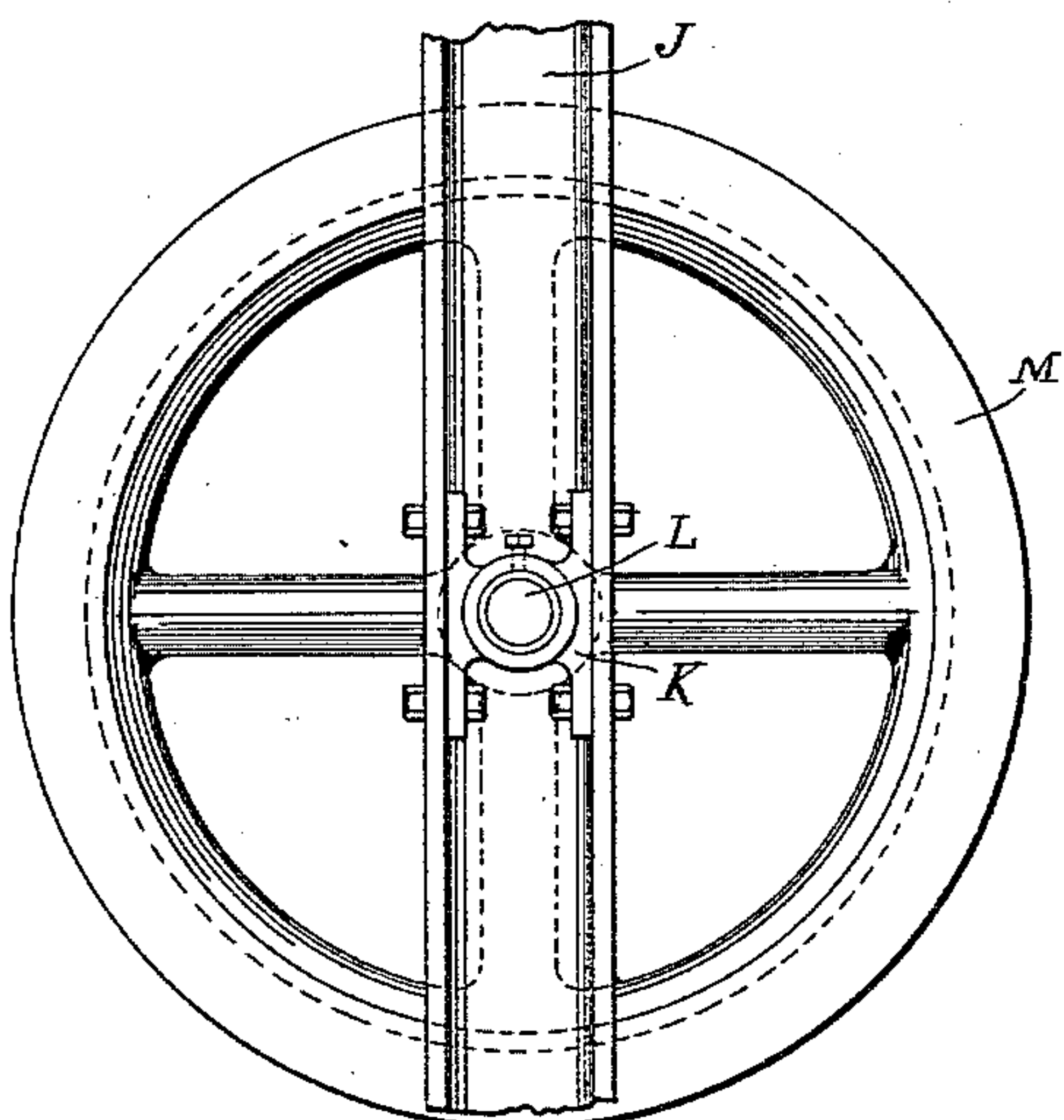


Fig. 5.

Fig. 6.

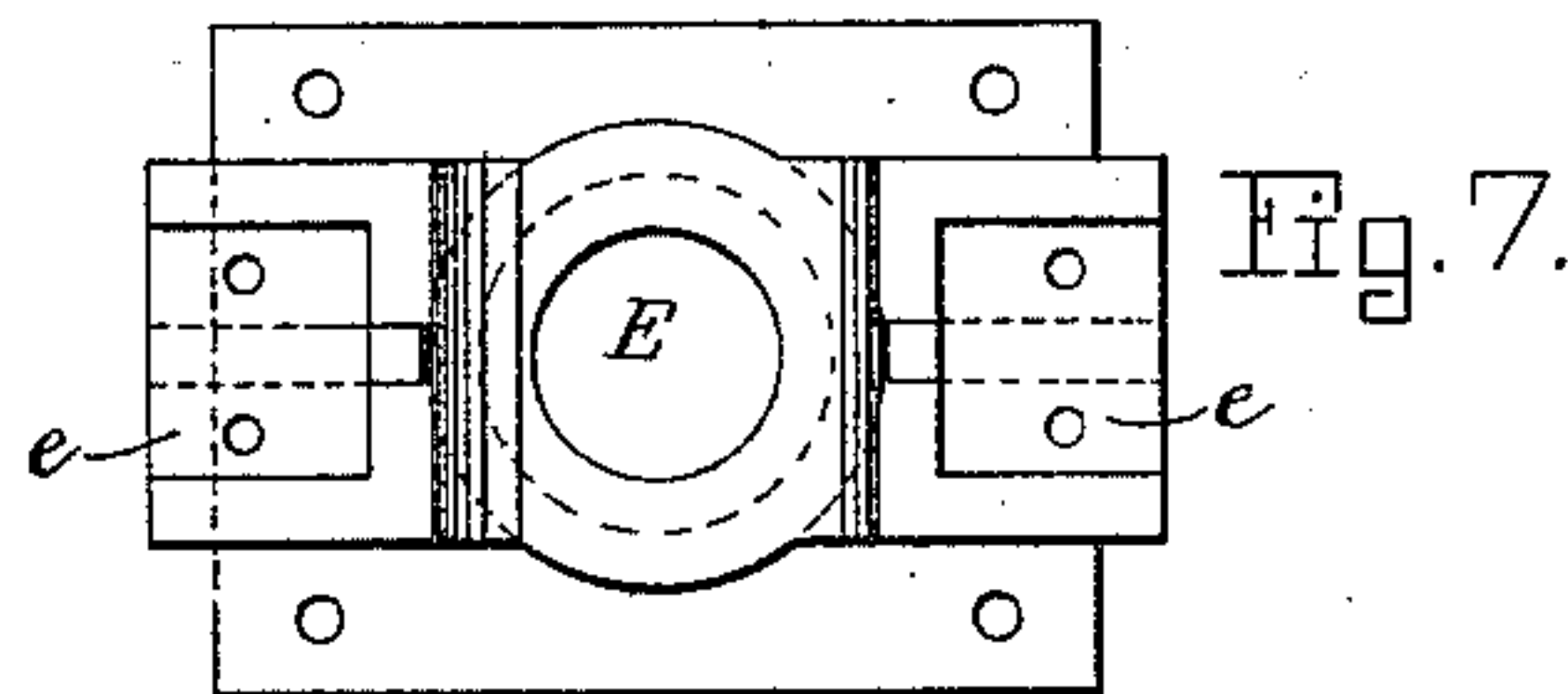
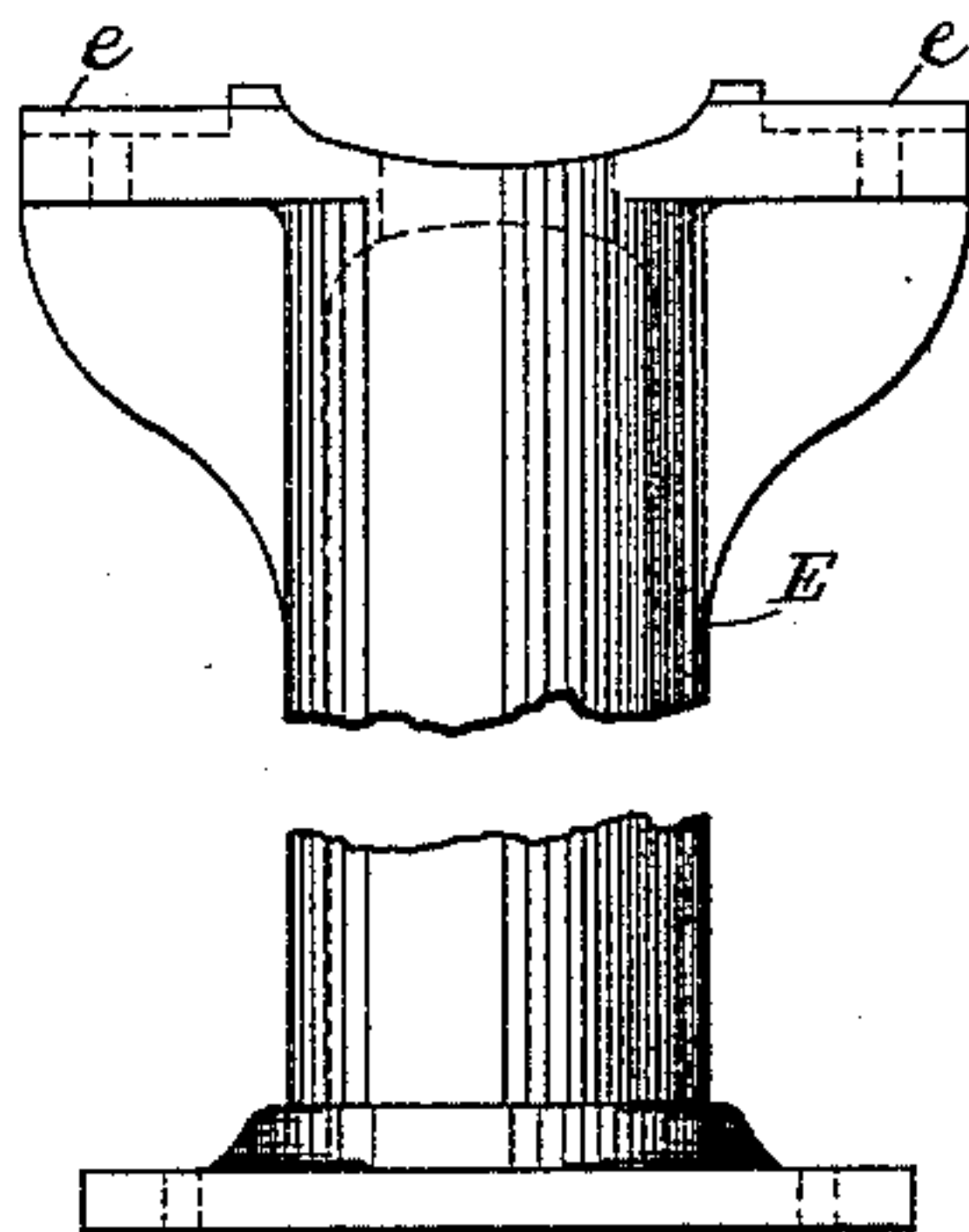


Fig. 7.

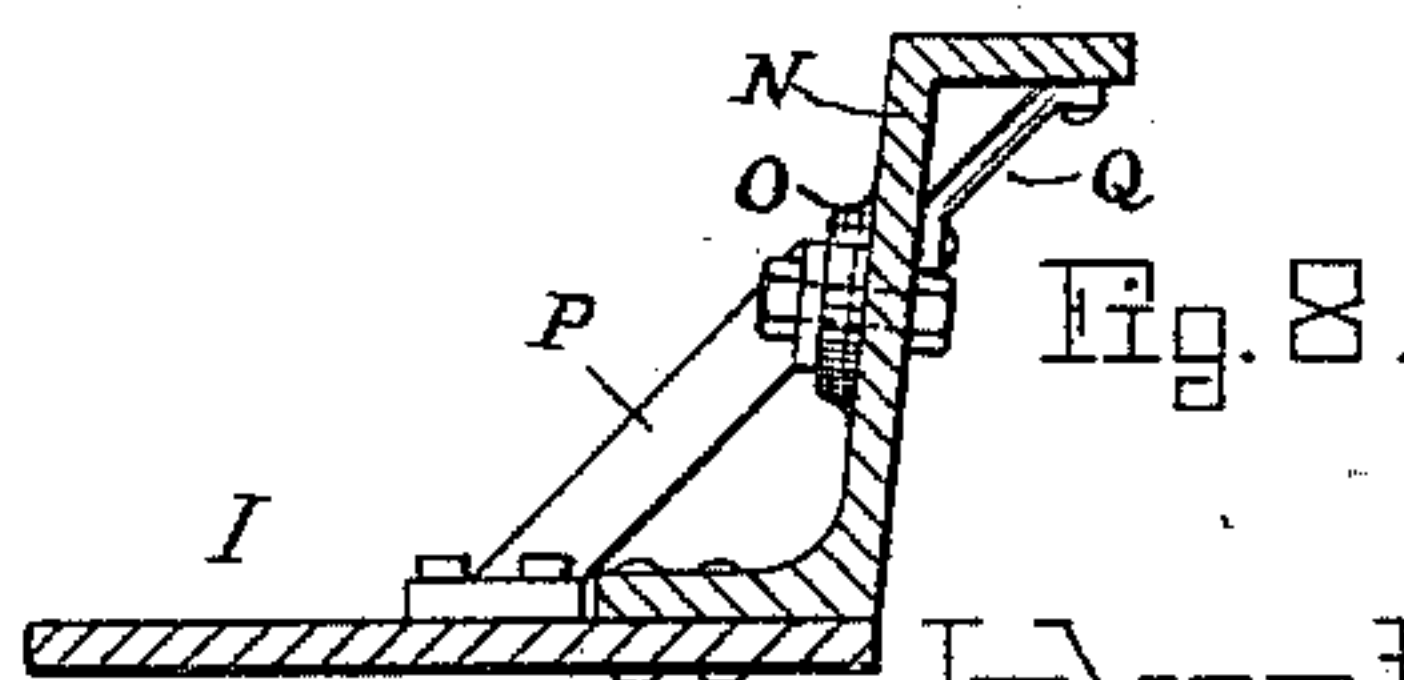


Fig. 8.

Witnesses.

Edward Hobbs  
Geo S Tolman 2<sup>d</sup>

Inventor.

R. T. White



(No Model.)

3 Sheets—Sheet 3.

R. T. WHITE.  
CABLE RAILROAD AND CONDUIT.

No. 437,955.

Patented Oct. 7, 1890.

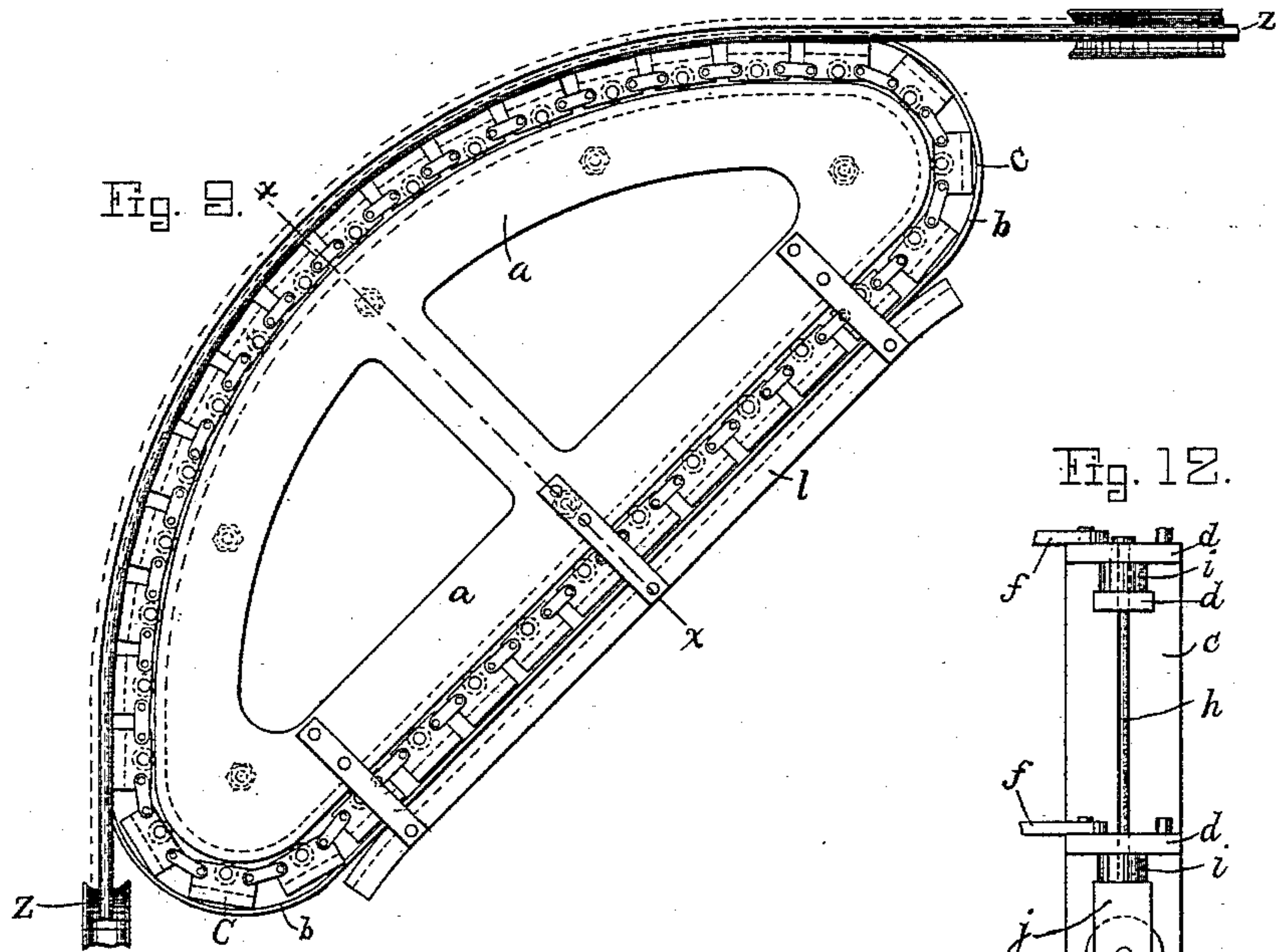


Fig. 12.

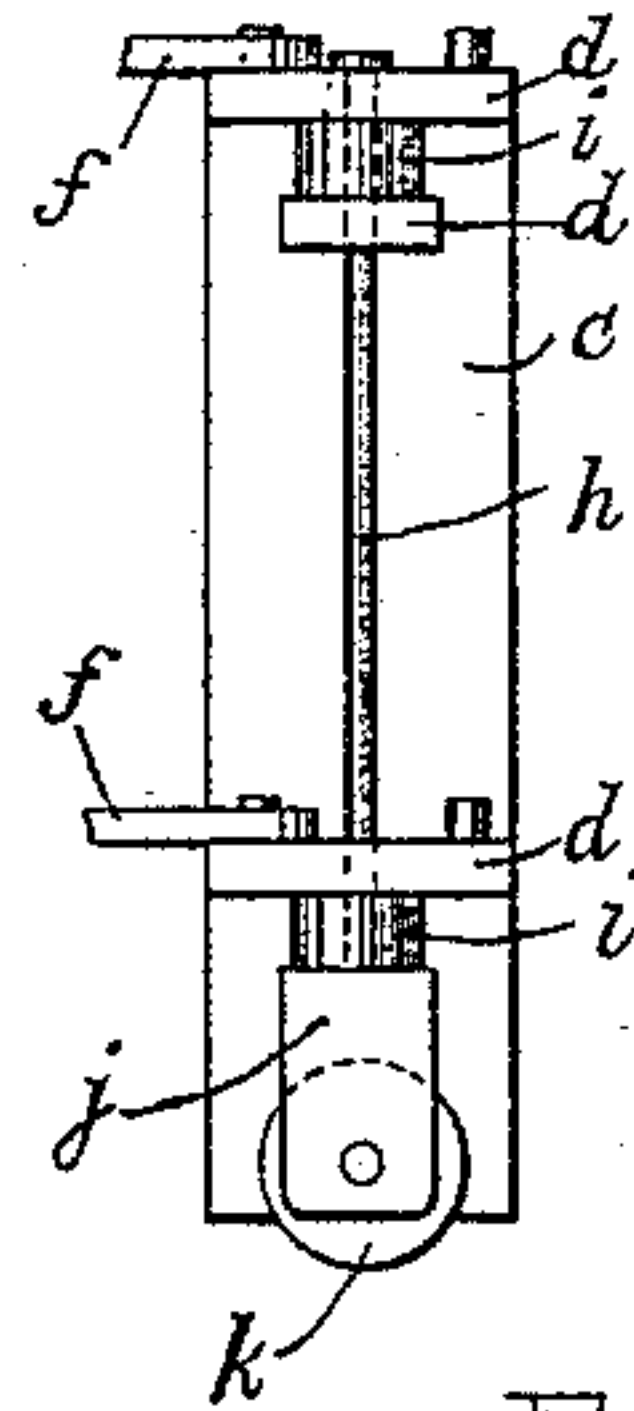


Fig. 13.

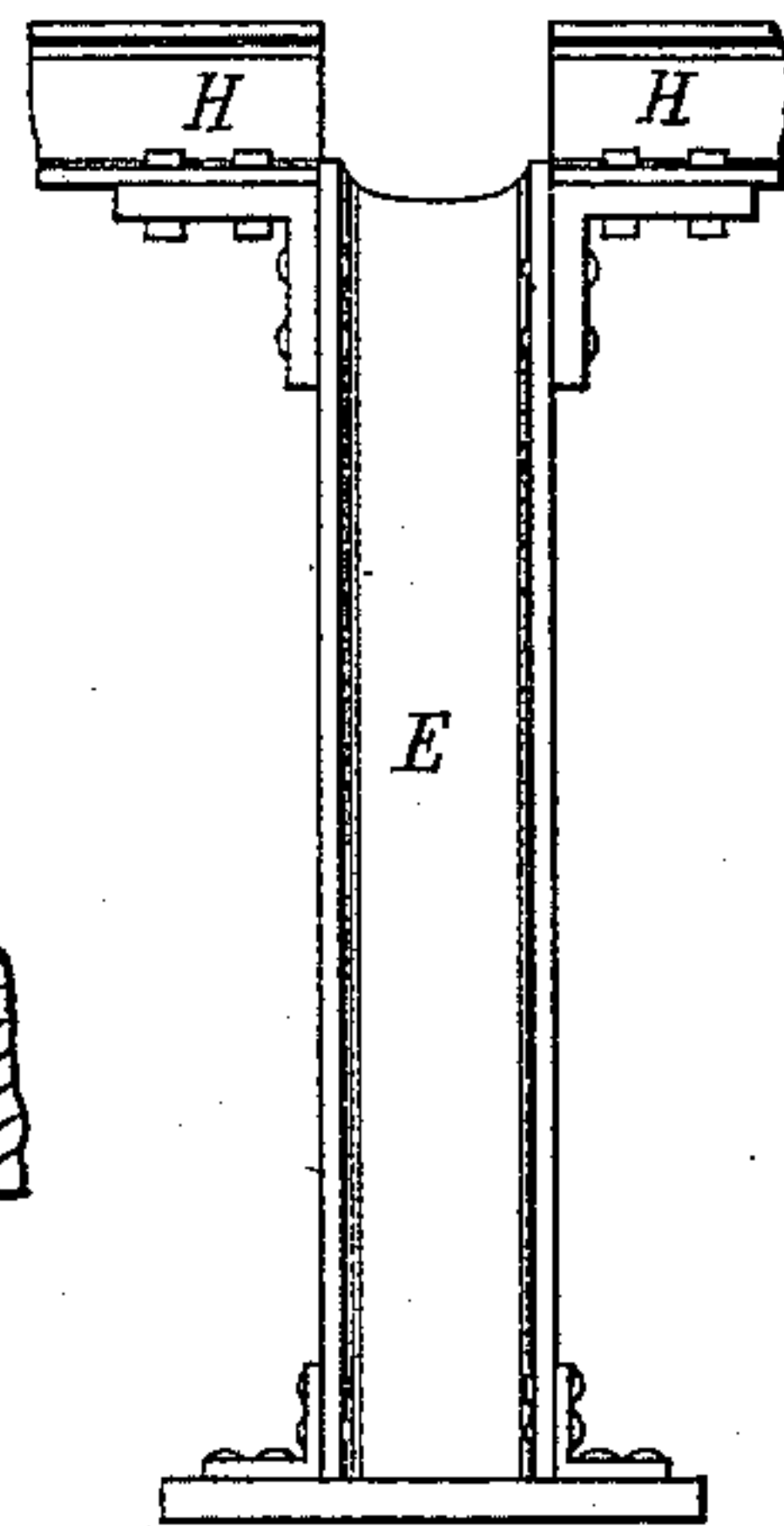


Fig. 10.

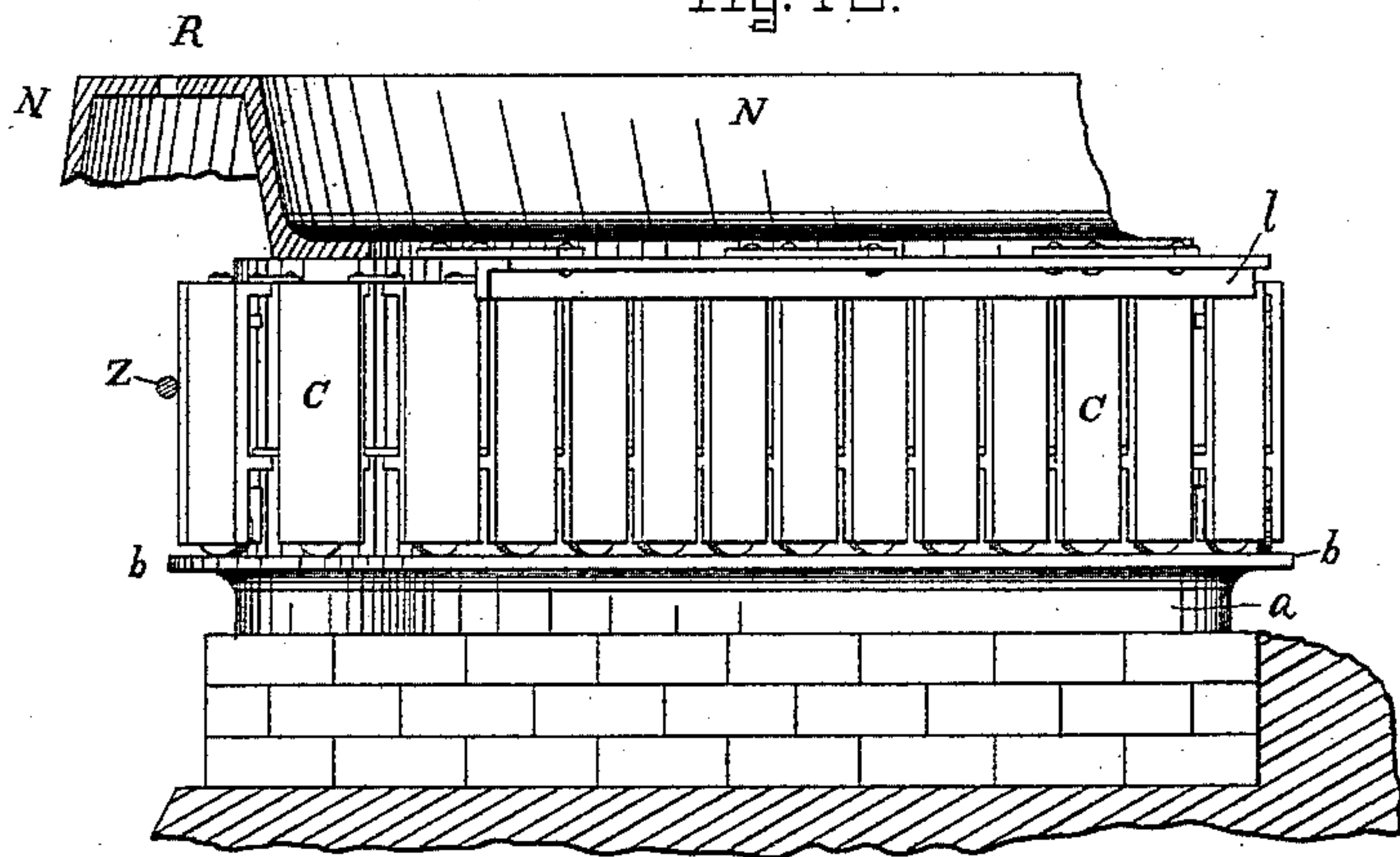
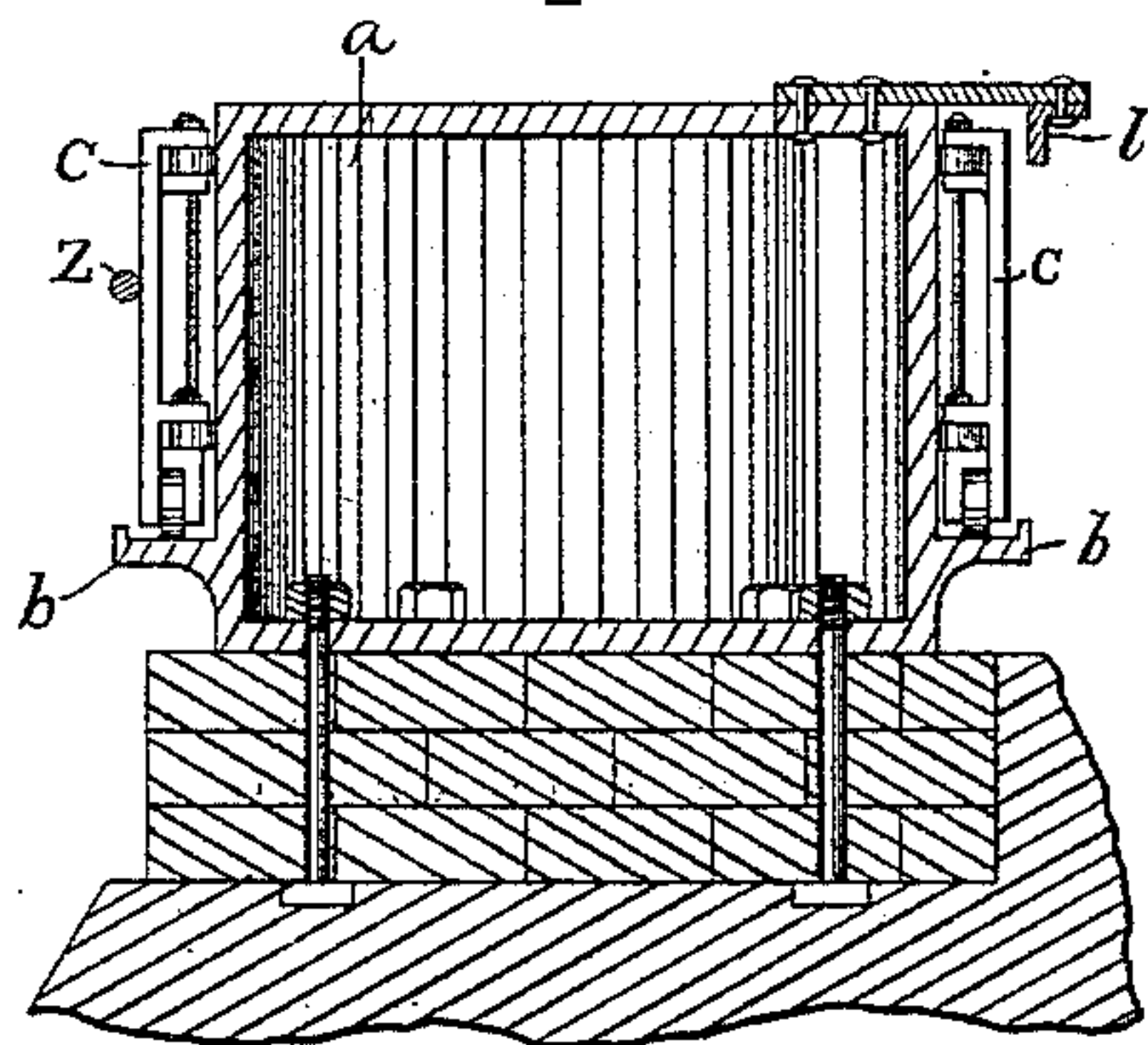


Fig. 11.



Witnesses.

Edward Hobbs  
Geo S Tolman & Co

Inventor.

R. T. White



# UNITED STATES PATENT OFFICE.

REYNOLDS T. WHITE, OF BOSTON, MASSACHUSETTS.

## CABLE RAILROAD AND CONDUIT.

SPECIFICATION forming part of Letters Patent No. 437,955, dated October 7, 1890.

Application filed April 18, 1888. Serial No. 271,090. (No model.)

*To all whom it may concern:*

Be it known that I, REYNOLDS T. WHITE, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Cable Railroads and Conduits, of which the following is a specification.

My invention has reference to that class of railways known as "cable roads;" and the invention consists in the construction of the roadway and conduit and in the construction of rolling guides to carry the cable around curves and corners, all as hereinafter fully described, and pointed out in the claims.

Referring to the accompanying drawings, Figure 1 represents a transverse vertical section through a double-way conduit embodying my invention. Fig. 2 is a plan or top view of a portion of the same. Fig. 3 is a longitudinal vertical section showing one of the pulleys for carrying the cable. Fig. 4 is a side view of one of the pulleys for carrying the cable, showing the manner in which it is connected to the standards. Fig. 5 is a plan or top view of the same with the standards in section. Fig. 6 is a side view of one of the columns for supporting the ways under the grip-slot. Fig. 7 is a plan or top view of the same. Fig. 8 is a section of one side of the grip-slot, showing how the same is stayed and adjusted. Fig. 9 is a plan or top view of a curve, showing the arrangement for carrying or guiding the cable around curves or corners. Fig. 10 is a rear elevation of the same. Fig. 11 is a vertical section taken on line *xx* of Fig. 9. Fig. 12 is a rear view of one of the links of the friction or rolling chain. Fig. 13 is a view of a post or column made of wrought metal.

In constructing a conduit for cable roads according to my invention I first dig out a trench of the required width and depth and cover the bottom thereof with concrete, brick, or stone A, the places where the columns or standards are to stand being preferably raised up a few inches, as shown, and in each of these raised portions I embed a metal plate B, upon which columns E E are arranged at suitable intervals under the center of the track or grip-slot R to support the cross-beams H and central portion of the way where the

opening for the grip comes, and half-columns F (see Figs. 1 and 2) are arranged at the sides to support the outer ends of the cross-beams H. To the outer side of the half-columns F metal plates G are secured to form the side walls. These plates are strengthened by longitudinal T-irons *g*; or, if desired, the side walls may be of brick or stone, as shown at G on the left of Fig. 1.

C C are columns resting upon and secured at their lower ends to the plates B, and they are arranged so as to stand directly under and are secured to the girder-rails D D, so as to support said rails in the center between the columns E E. The ends of the rails I prefer to rest or join upon the cross-beams H.

Resting upon and secured to the columns E E are cross-beams H H, (of I-beam form,) upon which rest the ends of the covering-plates I I'. One of the sides of the plate I is bent so as to rest and be secured upon the flange of the girder-rails D, the plates I being thus bent on both sides, as shown. Between the columns E are secured standards J J, of channel-iron, which support the central portion of the covering-plates I on their inner sides, and also form supports for the bearings K, in which is secured a hollow shaft L, upon which is mounted a pulley M, that carries the cable. Standards J J are placed under each section between posts E E; but pulleys M may be placed in every other section or any desired distance apart.

To the inner edges of the covering-plates I are secured Z-shaped plates N, that form the grip-slot and space for the grip to run in. The upright portions of these plates are stayed by trusses or braces P. By having the sides and upper flange thus stayed, supported, or braced it will be impossible for the grip-slot R to close; or instead of the upper ends of the braces P being rigidly secured to the Z-plates N the upper ends may be provided with a projection which enters a boss O on the side of the plate N, (see Fig. 8,) and is held thereto by a bolt and nut, so that should the grip-slot become disarranged by closing or otherwise it can be readjusted by means of the screw-bolt, as the stay P is rigidly secured to the plate I, so that it cannot move. By tightening or loosening the nut on the bolt the plate N can be sprung outward or inward, as desired. I



also prefer to place a stay Q to support the upper flange of the plate N, as shown.

It will be seen that the columns E, that stand directly under the grip-slot, are not so tall as the columns C, that support the rails, the difference in height being about the depth of the I-beam cross-girders H, which rest upon the columns E, thereby allowing sufficient room for the slack of the cable, so that it will not come into contact with the upper portion of said column. I also prefer to hollow the upper end of the column E, as shown in Figs. 6 and 7, so as to give an additional space, and I also prefer to form that portion upon which the I-beam girders H rest in the form of a shoe e, as shown, so as to prevent the possibility of the girders and columns twisting or frost forcing them together, as the ends of the I-beam girders fit and are held at their ends in the shoe e, as shown, on the upper end of column E. At suitable intervals in the central covering-plates I, I provide man-holes S, and I further strengthen said central portion by means of short strengthening-ribs T, as shown.

The spaces between the rails D and the plates N are filled up with stone, wood, or other suitable paving to form the road-bed.

The spaces beneath the road-bed it is designed to utilize as follows: In the side spaces U telegraph cables or wires may be arranged on one side and cables or wires for electric lighting and such like purposes on the other side. In the space U' gas, water, or steam pipes may be laid, and the space U<sup>2</sup> is intended to be kept clear, so that workmen can readily and easily pass along. It will be seen that by this construction all the parts are of wrought metal, except the supporting-columns E and C and braces P, thereby producing a very strong and cheap conduit for cable roads, and, if desired, wrought-metal columns or posts may be employed. One of such columns or posts I have shown in Fig. 13 with a base-plate secured to post by angle-irons and rivets and I-beams H H, resting on brackets that are riveted to post E at or near its upper end, the upper end of the column or post being slightly above the lower edge of the beams H, thereby preventing them from being forced together.

Although I have shown and described a double track, it is obvious that a single track may be constructed in the same manner.

On Sheet 3 I have shown the means I employ for carrying the cable around curves or corners. This consists of a metal frame a, the outer edge of which is curved, having nearly the same radius as the track. The back portion of the frame is flat and the ends rounding, as shown in Figs. 8 and 9. This frame is mounted upon and secured to a bed of brick or stone work, as shown in Fig. 11, and it is provided near its lower edge with a lip or flange b, upon which travel the supporting-wheels of the endless traveling bed. Upon this frame is mounted an endless traveling bed consisting of a series of upright

plates c, connected together by means of links f. The lower end of each plate is provided with a saddle j, in which is mounted a wheel which runs upon the lip or flange b, and the plates c are also provided with lugs or projections d on their rear sides, in which is secured a rod h, upon which are mounted friction-rollers i. The upper end of the rod h is secured by a nut N. At the top of the rear side of the frame a, I secure a guide l to prevent the upper ends of the endless traveling bed from tipping over should the joints work loose, the outer or bearing surface of the endless chain being always kept in close contact with the frame a by the cable Z. It will be seen that by this construction the endless traveling bed is free to travel around the frame a, and it will work very easily, as it is carried by the wheels k, and all friction between the chain and frame is prevented by the rollers i i, so that there is no friction on the cable, as the chain works around with it. Of course, the shape of the frame may have to be altered to adapt it to various places.

In the drawings I have shown the cable directly under the grip-slot; but the position of the cable in relation to the slot would have to be regulated according to the grip employed.

It will be seen that in constructing a cable road and conduit on this plan the roadway can be made very strong and the covering-plates, Z-irons, and rails can be rolled any desired length, the joints being broken on the beams, so as to give additional strength to the structure, and the conduit may be connected with sewer to drain off any water that may get into same, and the main posts and I-beam girders placed at suitable distances apart, so that the joints may be broken on the center of the I-beams and securely riveted or bolted together, and in addition to stay or brace P at joints of Z-iron suitable fish-plates may be used to hold the ends secure, and suitable troughs may be made to lay wires in and supported as shown in Fig. 1, and the conduit may be connected.

In case a conduit only is wanted for wires, pipes, &c., the rails and Z-irons are dispensed with and the I-beams and covering-plates are carried across the trench and concreted or paved; or if a common street-railroad is wanted with a conduit under it the Z-irons furnishing the grip-slot are dispensed with and the covering-plates run from one rail to the other, the man-holes being perforated to admit air necessary to allow gases that may leak out of pipes or sewers to evaporate, thus preventing explosions.

Having thus shown and described my invention, what I claim is—

1. In a cable road and conduit, columns or posts supported upon suitable foundations and bed-plates and arranged the proper distance apart, in combination with cross-girders, girder-rails, and covering-plates, said covering-plates resting on said cross-girders and



lower flange of said girder-rails, and **Z**-irons secured to said covering-plates to form a grip-slot opening, substantially as shown and described.

5 2. In a cable road, columns **E F** and cross-bearings **H**, in combination with columns **C**, girder-rails **D**, covering-plates **I N**, and walls **G**, of iron, brick, or stone, substantially as shown and described.

10 3. In combination with a cable road, iron standards **J**, provided with bearings **K**, shaft **L**, and cable-pulleys **M**, said standards being arranged longitudinally between the columns **E** and on a line with columns **C** to support  
15 the track under the grip-slot, substantially as shown and described.

4. In the construction of cable roads, covering-plates **I**, supported at their ends on cross-beams **H** and on one or both sides by the  
20 lower flange of the girder-rails **D**, substantially as shown and described.

5. In a cable road, columns for supporting the ends of cross-girders of **I**-beam form, said columns having at their upper ends lipped  
25 brackets, in which the cross-girders are secured the proper distance apart to form an unobstructed opening above the column for the cable and grip to run through, substantially as shown and described.

30 6. In combination with a cable road, **Z**-shaped plates **N**, for forming the grip-slot, said plates being secured to the covering-plates **I**, that are secured to girder-beams that are supported by columns or posts and stayed  
35 by braces **P**, secured to covering-plates and **Z**-irons, substantially as shown and described.

7. In a cable road, in combination with columns **E F**, cross-beams **H**, girder-rails **D**, and covering-plates **I N**, the columns **C** and chan-  
40 nel-iron standards **J**, for supporting the road-

bed between the cross-beams **H**, substantially as shown and described.

8. The endless apron consisting of plates **c**, connected together by straps or bars **f** and provided with traveling and friction rollers, 45 in combination with the frame **a**, substantially as and for the purposes set forth.

9. A cable road having an adjustable grip-slot composed of wrought-metal **Z**-irons riveted to wrought-metal plates and having a 50 brace secured to said plates and a bolt and boss at its upper end, as and for the purpose set forth.

10. A cable road having the following elements: a conduit the top of which is covered 55 with wrought-metal plates, rails, and pavement, said top being supported by posts and beams and having a grip-slot and opening for grip and cable to run in between the rails, and an endless traveling bed to guide the ca- 60 ble around curves and corners, all arranged as shown and described, and for the purposes set forth.

11. A cable road having a conduit built of wrought metal under it, said conduit being 65 about the width of the tracks above it and having suitable openings to get into said conduit and having suitably-mounted carrying-pulleys for said cables to run upon, and a grip-slot over said pulleys and rails on each side 70 of said grip-slot, in combination with a wire cable running on said pulleys in conduit, as and for the purposes set forth.

In testimony whereof I have signed my name to this specification in the presence of 75 two subscribing witnesses.

REYNOLDS T. WHITE.

Witnesses:

SIDNEY WETMORE,  
JOHN R. SNOW.