

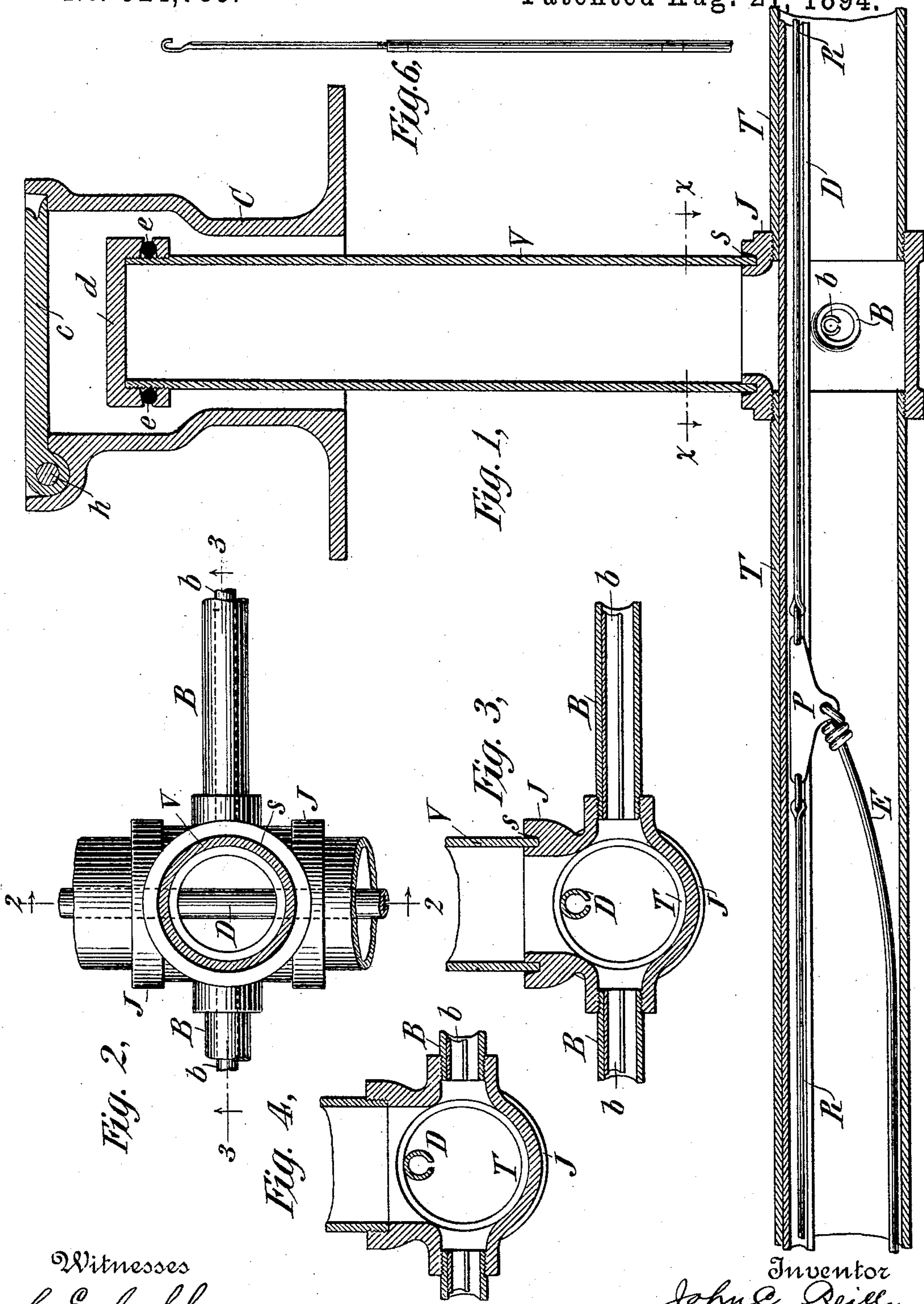
(No Model.)

2 Sheets—Sheet 1.

J. C. REILLY.  
ELECTRICAL SUBWAY SYSTEM.

No. 524,789.

Patented Aug. 21, 1894.



Witnesses  
C. E. Ashley  
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Inventor  
John C. Reilly  
By his Attorney  
Wm. B. Varrick

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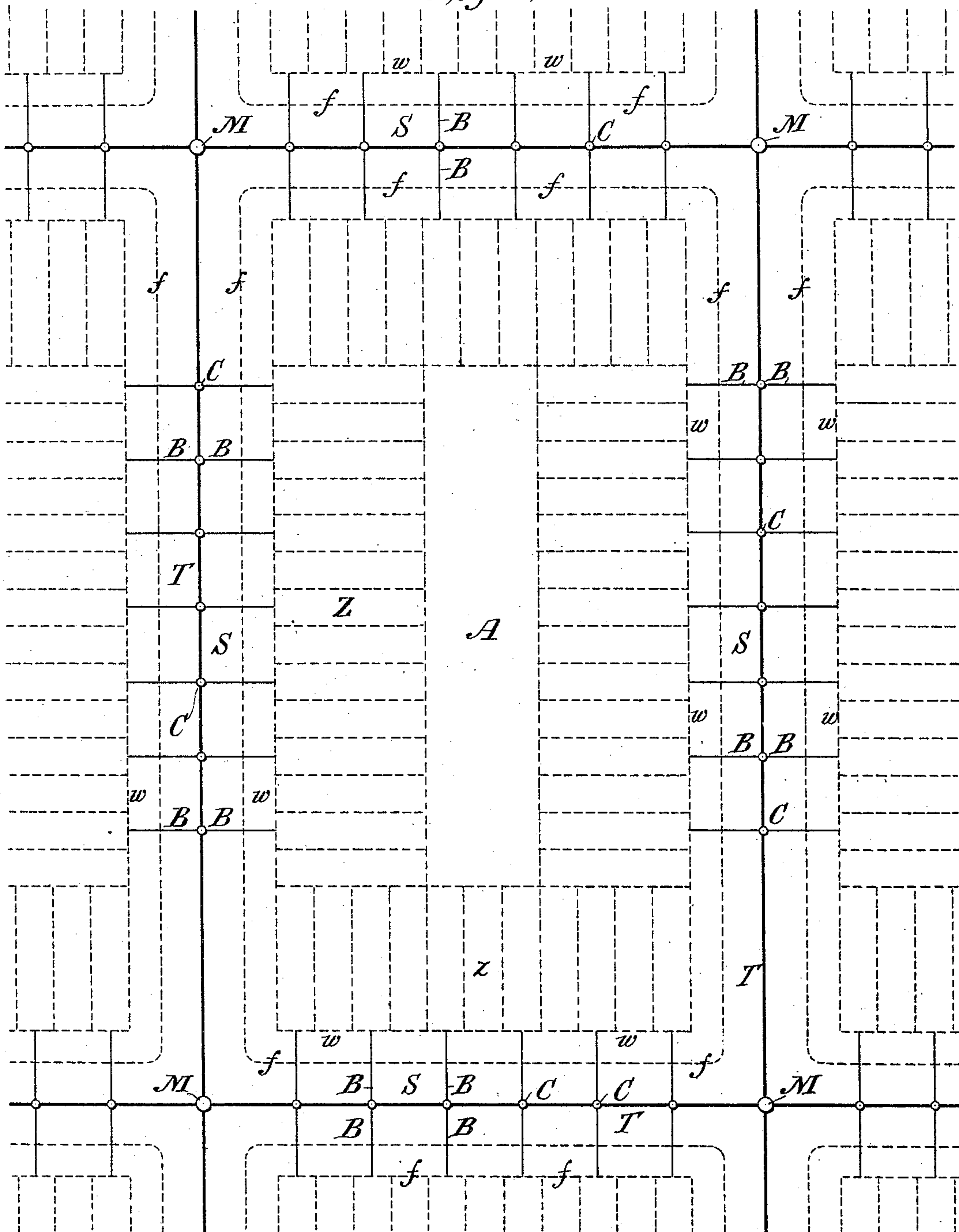
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Fig. 5,



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# UNITED STATES PATENT OFFICE.

JOHN C. REILLY, OF BROOKLYN, NEW YORK.

## ELECTRICAL SUBWAY SYSTEM.

SPECIFICATION forming part of Letters Patent No. 524,789, dated August 21, 1894.

Application filed May 28, 1894. Serial No. 512,710. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN C. REILLY, a citizen of the United States, residing in Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Electrical Subway Systems, of which the following is a specification.

My invention is an improvement in electric subway systems in which a series of subscribers or sub-stations are furnished with separate electrical connections with a central station for the purpose of furnishing a means of communicating between any two stations either telephonically or telegraphically; it may also be used for supplying electric current for light, power, and other purposes.

The object of my invention is to provide means to cheaply and expeditiously furnish any subscriber with electrical connection, for any period of time, long or short; while no idle conductors are allowed to remain in position in the subway and the desired electrical connection or disconnection may be made in any kind of weather, at any time of year, whether the ground be frozen or not; and without disturbing the surface of the earth or the pavement.

By my improvements I am enabled to supply any subscriber on any block with temporary or permanent electrical connections without disturbing conductors in the main subway, without interrupting any circuit, without delay and with no more expense for time, material or labor than is incident to stringing an overhead wire.

It is well known that electrical subways as maintained and operated in the large cities consist of a series of ducts or passages within which insulated conductors are inserted and withdrawn as occasion may require, and that when a subscriber desires electrical connection with a central station it has been necessary to dig a trench from the subscriber's property line to the line of the subway in the street, to place a duct or tube therein, to tap the main subway and lead out or join the subscriber's branch with the subway conductor; this has usually consumed a period of one or two days, interrupted travel, and been very expensive.

My invention involves placing main pipes or ducts in the various streets; and at inter-

secting points or streets a manhole or working chamber large enough to admit one or more men; within each pipe or duct I place a drawing-in device consisting of a slotted tube fixed to the interior of the duct; within the slot there is a plate or link for attachment to the conductor and within the slotted tube there is a rope or chain for moving the plate in either direction substantially as shown and described in my Patent No. 447,350, dated March 3, 1891.

My present improvement consists in placing within each tube or duct at intervals of say twenty to forty feet a series of five-way couplings; two of these ways or stubs are for connection with the divided ends of the main tube, two other smaller stubs are at opposite sides of the coupling and are connected to smaller tubes leading to a point within the property line of adjacent buildings, the fifth is connected to a vertical pipe or tube, preferably of sufficient diameter to permit the insertion of a man's arm; the upper end of this tube has a water-tight cover and is arranged concentrically within a tubular section having a cover which is preferably hinged and located at or about the street surface. The branch tubes extending to the property line enter the main subway or duct at a point or plane below the plane of the drawing-in device; each branch is preferably supplied with some suitable means for drawing in a conductor and when a conductor is to be passed through a subscriber's branch it is carried along by the drawing-in device of the main duct above the line of the branch tube, the drawing-in device of the branch tube is run out to intercept it, the workman's hand is passed down the vertical tube, the conductor is transferred from one drawing-in device to the other and the conductor is drawn into the subscriber's premises without breaking its continuity. The drawing-in device of the main subway is not divided at the five-way coupling but is continuous from manhole to manhole so that the operation of placing and moving conductors with respect to the main duct is not interrupted at the various coupling boxes. The vertical tube sections are provided with a concentric tube section at the street surface, and a space is allowed between the top of the inner tube and the cover



of the outer tube to provide for any slight variations in the level of the surface of the street without varying the length of the vertical pipe sections.

5 The accompanying drawings illustrate my invention.

Figure 1 is a vertical central section of a main subway duct with its drawing-in device, the five-way-coupling, the vertical tube and the concentric tube section and cover. 10 Fig. 2 is a plan view of the five-way-coupling below the line  $x-x$  Fig. 1. Fig. 3 is a central vertical section on the line 3-3 Fig. 2. Fig. 4 is a modification of Fig. 3. The section of Fig. 1 is on the line 2-2 Fig. 2. 15 Fig. 5 is a plan of one or more city blocks, showing subways placed in the center of the roadway, intersecting working chambers or manholes at crossing points, with five-way-couplings at frequent intervals, from which 20 branches are carried, in opposite directions, to points within the property line of adjacent buildings. Fig. 6 is a form of drawing-in device.

25 Referring to Fig. 1, T is the main subway duct, preferably an iron pipe four inches in diameter; within this duct and preferably upon its upper wall is fixed a smaller iron tube D, having a slot extending its entire 30 length, this slot is upon the under side of the small tube; and a plate P formed to move along smoothly in the slot and project through it, as shown, furnishes means for attaching a conductor to be drawn in; a rope or chain R, 35 is attached to this plate P so that it may be drawn along from one manhole to another. It is important that the continuity of this drawing-in tube be not interrupted at substations or at any point intermediate successive 40 manholes as this would interfere with drawing conductors into the main subway.

J is a five-way coupling or connection having stubs which may be either screw threaded or arranged to take a lead seal joint as shown 45 at s, Figs. 1 and 3; two stubs are for connection with the divided ends of the main subway duct; the drawing-in tube D, must be continuous and passes through the coupling box J, without interruption; two other stubs 50 usually arranged at right angles to the first named pair are for connection with tubes of comparatively small diameter B which enter the five-way-coupling at a point or plane below the line or plane of the drawing-in tube 55 D, and extend to a point within the property line of adjacent buildings; each tube B is provided with suitable drawing-in devices like  $b$  or a hook and sectional rod may be employed, if preferred, like that shown in Fig. 60 6; the fifth stub is upon the upper side of the five-way-coupling and is preferably four inches in diameter to receive the vertical tube V extending to a point at or near the surface of the street; this tube is provided with a 65 screw cap  $d$  and a gasket  $e$  rendering it gas and water tight; concentric with the tube V is a casting of tubular form C at the top of

which is a cover  $c$  hinged at  $h$ . This top or cover is flush with the surface of the street and of sufficient mechanical strength to withstand the street traffic; by this arrangement 70 any slight inaccuracy in the street level is compensated for by accommodating the variation in the space between the covers  $c$  and  $d$ .

75 I have shown the tube V with a lead seal junction  $s$  at the coupling box; when this form of connection is employed any extraordinary variation in the street level may be provided for by cutting off the pipe section 80 V, and the necessity for a screw thread-cut is obviated, although in some cases the screw-thread junction  $r$ , Fig. 4, combined with the concentric tube section C is sufficient.

Referring to Fig. 5, A indicates a city block, 85 S, S, are streets; T, T, are four main intersecting subways, with manholes or working chambers M, at each point of intersection;  $f$  is the curb line;  $w$  indicates the cellar wall line of adjacent buildings; C indicates a series of five-way coupling boxes interposed at 90 regular intervals, of say forty feet, in the subway T. B, B, are the smaller tubes connecting with the five-way coupling at one end and extending to the property line of adjacent 95 buildings, or to the cellar wall,  $w$ . It is to be understood that all these ducts and pipes are to be placed in position as an integral system; and, so arranged, afford facilities for immediately furnishing electrical communication 100 between any two points irrespective of the condition of the earth, the weather, or any conditions heretofore deemed insurmountable.

Assuming that the point or station Z desires a special wire or electrical connection 105 with the point  $z$  an exemplification of the operation of making the connection is as follows: Taking a sufficient length of insulated wire to the intermediate manhole M, one end 110 of the wire E would be connected to the drawing-in device of the main subway tube T, and drawn along to the five-way coupling C, immediately in front of Z; the covers  $c$  and  $d$  being removed the end of the conductor 115 would be connected with the drawing-in device from Z which has been run out through its tube B and the end of the conductor drawn into the station Z at the same time 120 the other end of the wire is connected to the drawing-in device of the subway T, adjacent to the station  $z$ ; the covers  $c$  and  $d$  of the nearest surface connection is removed for inspection, and to afford necessary access to the conductors, the end of the wire is transferred from the drawing-in device of the 125 main duct T, to the drawing-in device of the nearest unoccupied branch tube B and the end of the wire is drawn into the premises adjacent to the premises  $z$  whence it is carried 130 through the wall to the station Z. In this way it is possible to connect two stations in a few minutes' time without the necessity of breaking or making a joint in the conductor



while the operation is continually under the control and subject to the inspection of the workman and the operation of changing from one drawing-in device to the other is rendered certain, easy and expeditious.

I am aware of the United States patent of Munsie, No. 356,153, dated January 18, 1887. My invention differs from anything therein shown or described. Munsie provides no means for drawing a conductor past his working chambers or openings C which are really manhole openings; his drawing-in device is divided at opposite sides of said opening; his branch pipes do not open directly into the subway duct and connections can only be made through the manholes or openings C while the branches are out of direct operative relation with respect to the leading in devices.

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

1. In an electrical subway system the combination of general distributing ducts to receive insulated conductors located at an angle to each other and provided with manholes at intersecting points, a drawing-in device consisting of a plate or connection and means for moving it in a slotted tube located within the duct, said tube forming an unbroken track or way from one manhole to another, a series of five-way-coupling or connection boxes inserted in the line of a duct without breaking the continuity of its drawing-in device, said couplings comprising connections for the main duct, connection for opposite sub-station tubes, below the line of the drawing-in tube, and a vertical duct above said tube, extending to the street level, with means for drawing wires through sub-station tubes substantially as described, whereby any conductor may be carried from any manhole to any sub-station junction and there connected to the drawing in device and sub-station without opening the street or interrupting the passage through any main duct.

2. The combination in an electrical subway system of a main duct consisting of an iron pipe; manholes or working chambers at intervals, a series of five-way connecting or coupling boxes arranged at intervals between the

manholes, forming a junction between the divided ends of the main duct; branch pipes extending in opposite directions to points within the walls of adjacent buildings and a vertical pipe or tube extending to the street level, said coupling surrounding but forming no part of a slotted drawing-in tube located in the first named duct in a plane above the point of connection of said branch tubes, all arranged and operating substantially as described.

3. The combination of an iron subway pipe, manholes at suitable intervals; a slotted tube upon the interior of said pipe with drawing-in devices extending without interruption from manhole to manhole, and a series of five-way couplings interposed in the main duct between manholes, connected with tubes for branch conductors and a vertical tube extending to the surface of the street, substantially as described.

4. The combination of an iron subway pipe, manholes at suitable intervals, a slotted iron tube upon the interior of said pipe, with drawing-in devices, extending from one manhole to another without break or interruption, and a series of five-way couplings at intervals connecting divided ends of the subway pipe with branch tubes and a vertical iron pipe, said vertical pipe having a water tight cap and a tubular protecting case with a hinged cover flush with the street surface separated from said pipe cap by a variable space substantially as and for the purpose set forth.

5. The combination of an iron subway pipe extending from one manhole to another, a series of five-way couplings at intervals in said pipe, connecting its divided ends with lateral branch pipes, a vertical iron pipe extending to the street surface and a continuous drawing-in device consisting of a slotted tube located within the subway pipe, means for drawing a plate or connecting device along therein and means for drawing wires into the branch pipes, substantially as described.

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Witnesses:

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