(No Model.) 3 Sheets—Sheet 1.

# W. R. PATTERSON.

## APPARATUS FOR DRAWING TELEGRAPH CABLES INTO PIPES.

No. 294,500. Patented Mar. 4, 1884.

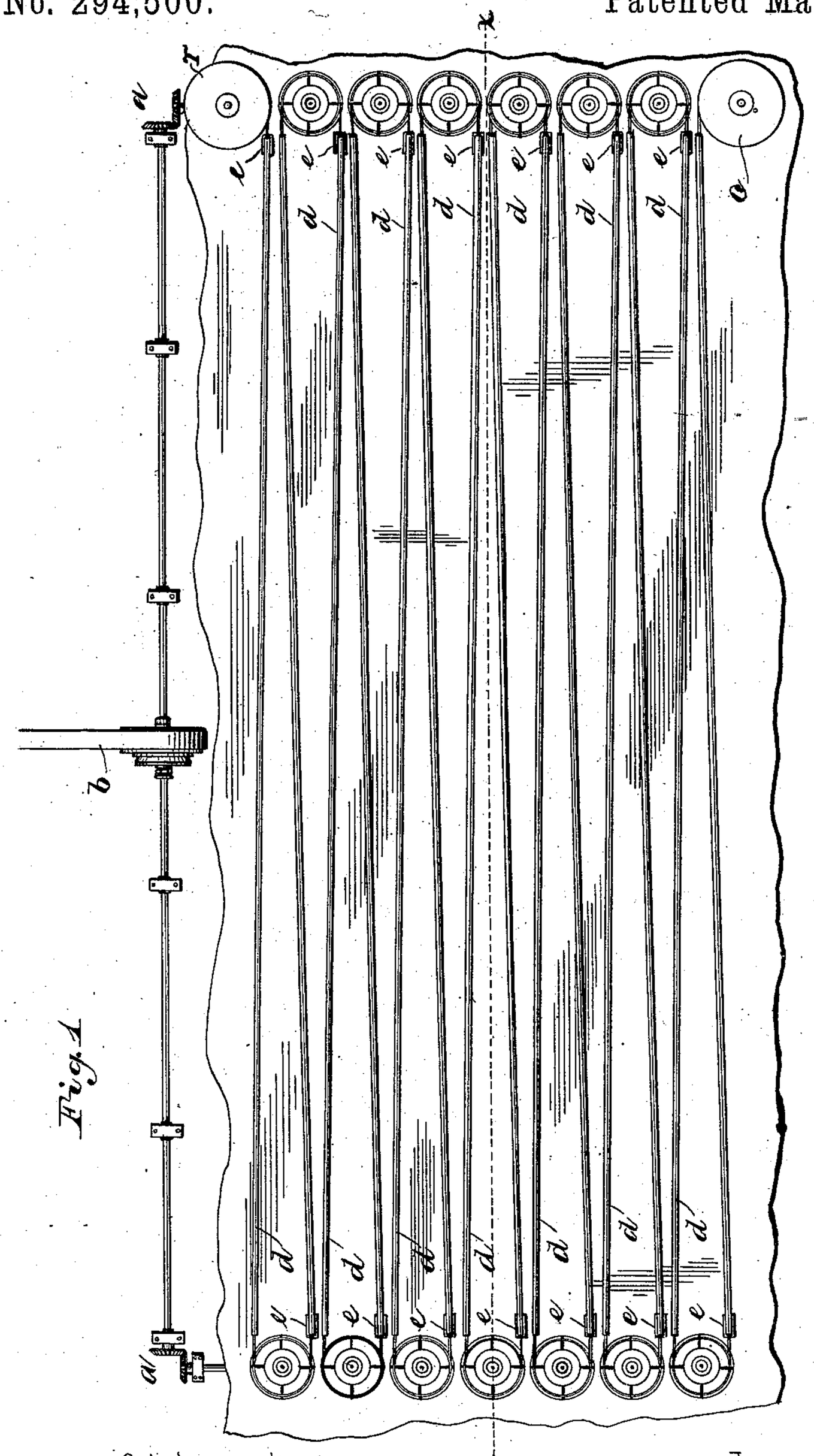

Fig. 1

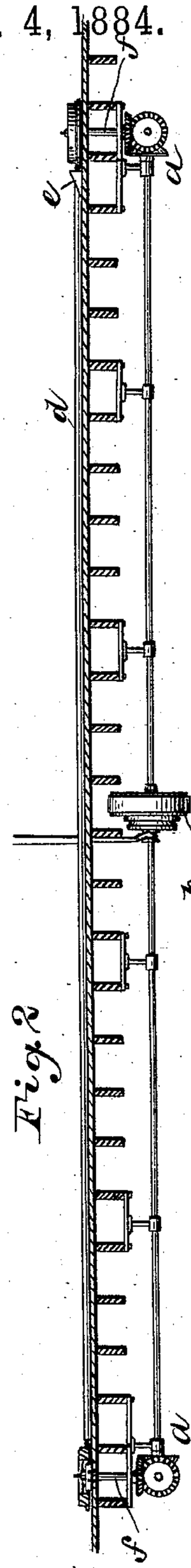

Fig. 2

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## APPARATUS FOR DRAWING TELEGRAPH CABLES INTO PIPES.

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*Fig. 3*

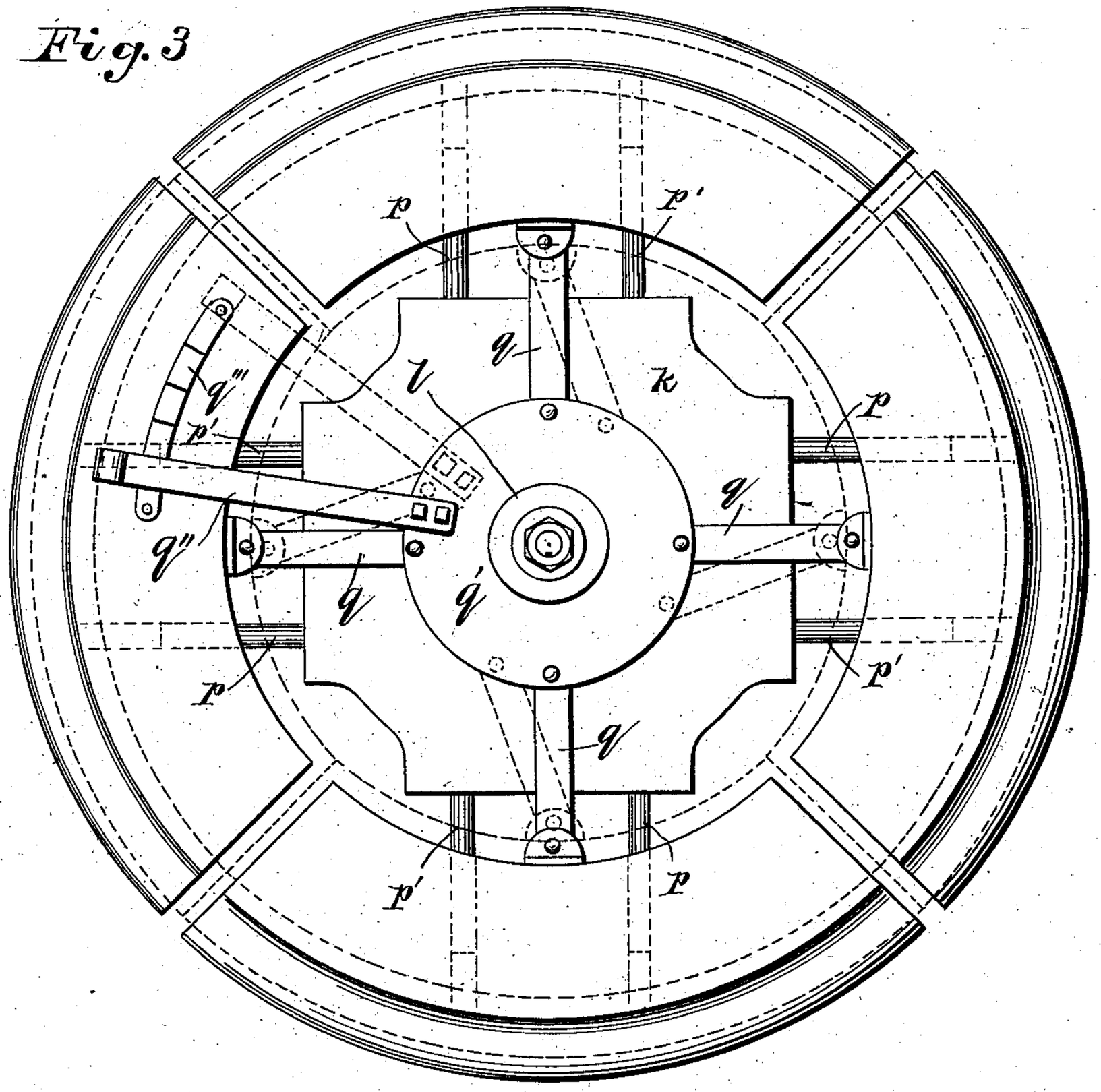
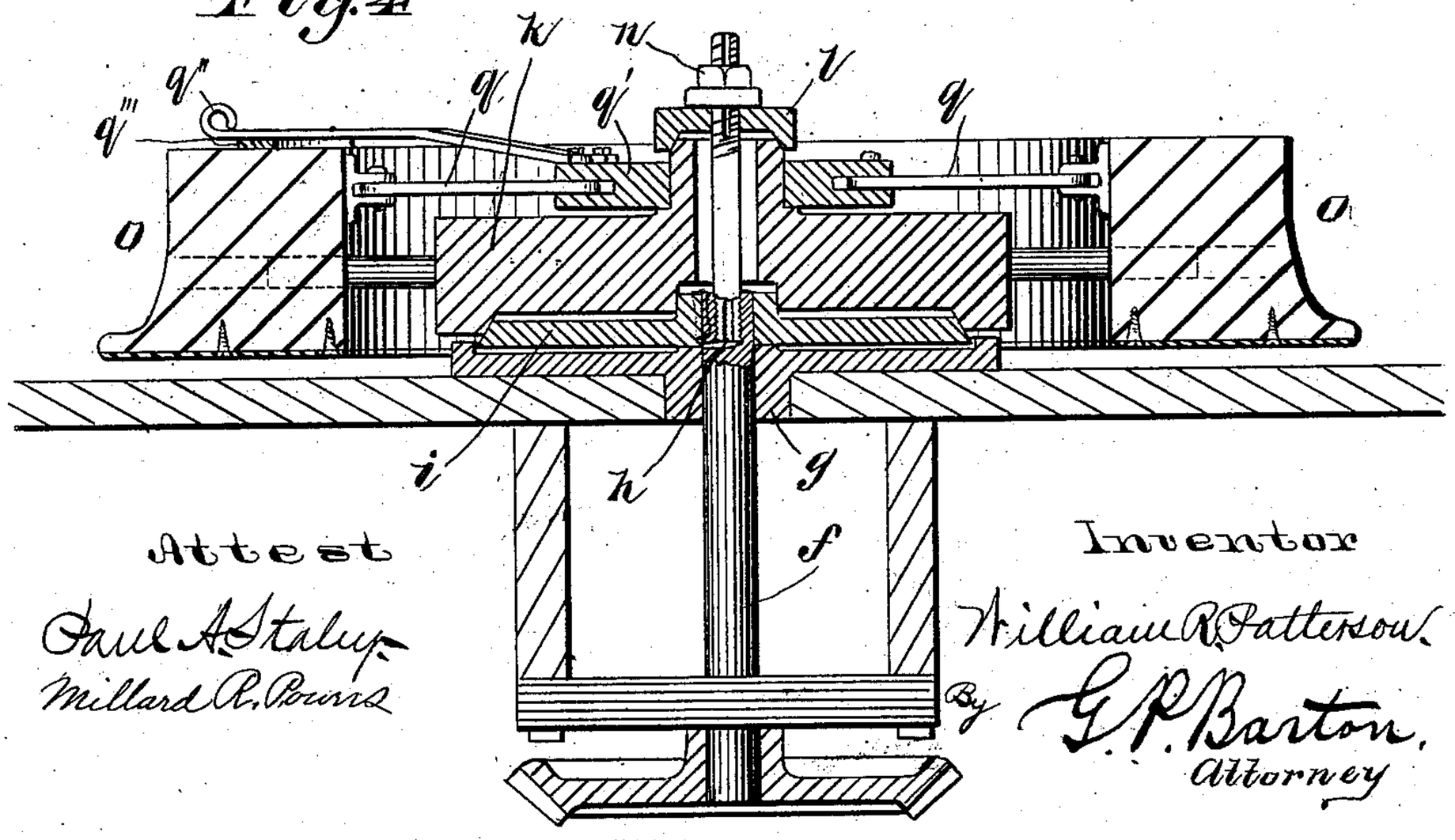



*Fig. 4*

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## APPARATUS FOR DRAWING TELEGRAPH CABLES INTO PIPES.

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Fig. 7

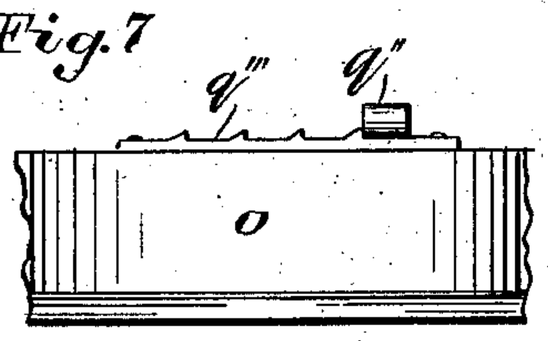



Fig. 8

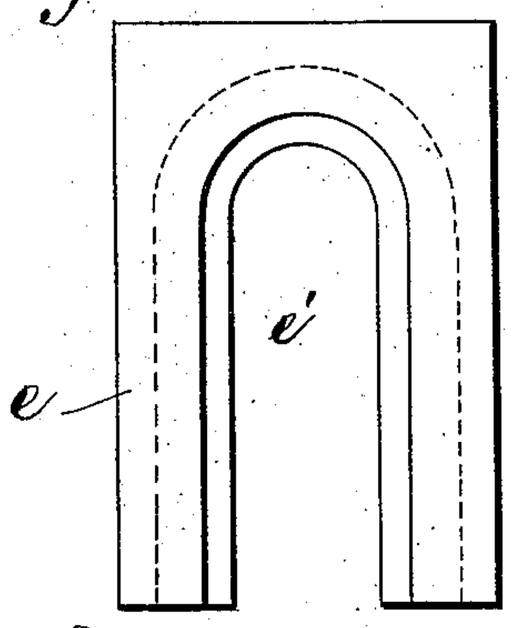



Fig. 9

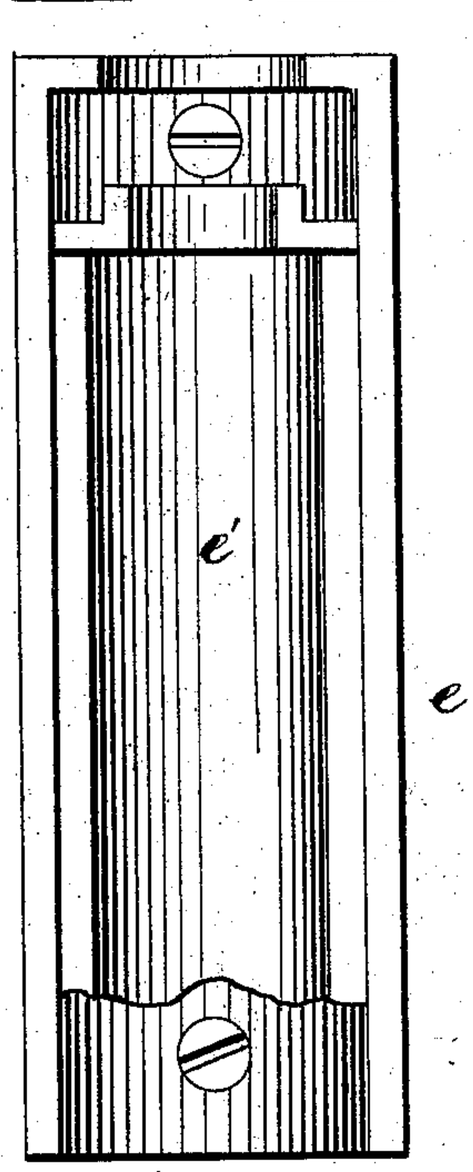



Fig. 5

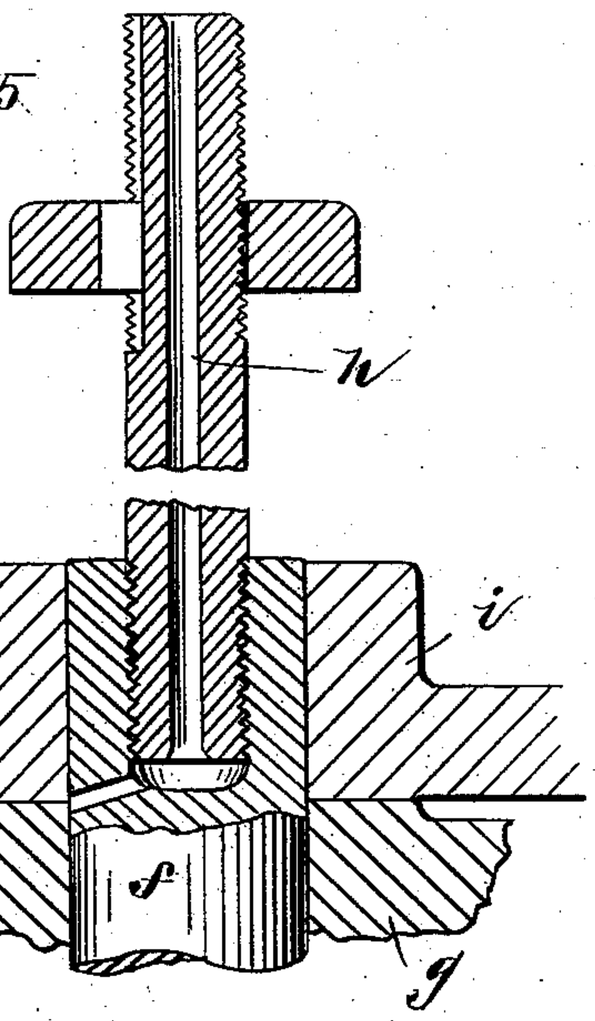



Fig. 6

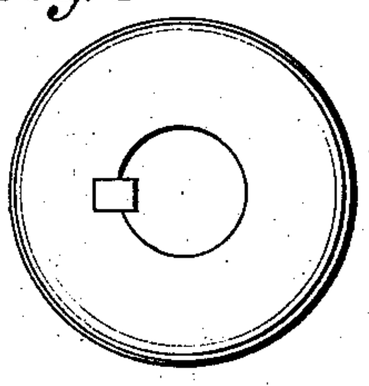
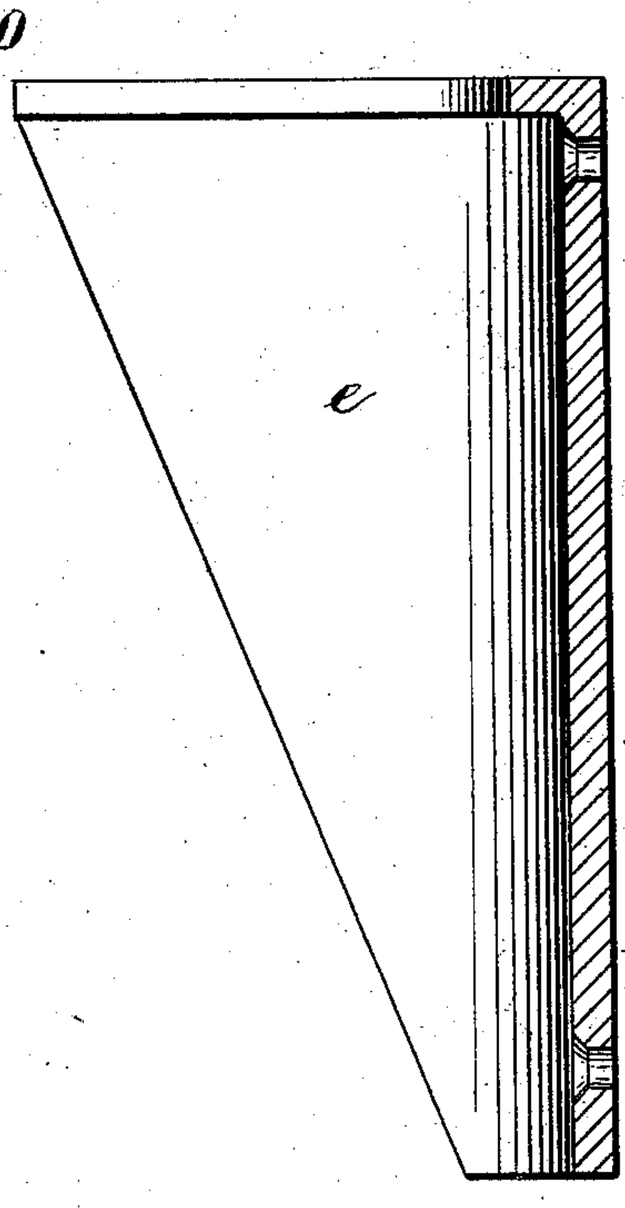


Fig. 10

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# UNITED STATES PATENT OFFICE.

WILLIAM R. PATTERSON, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WESTERN ELECTRIC COMPANY, OF SAME PLACE.

## APPARATUS FOR DRAWING TELEGRAPH-CABLES INTO PIPES.

SPECIFICATION forming part of Letters Patent No. 294,500, dated March 4, 1884.

Application filed July 28, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM R. PATTERSON, 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 Apparatus for Drawing Telegraph-Cables into Pipes, 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 the manufacture of telegraph-cables; and it consists in apparatus for drawing a core of insulated electrical conductors into sections of pipe. It is desirable that the core should be of considerable length. The pipe, which is usually of lead, may be in shorter sections. I find it convenient to use sections of pipe of about one hundred feet in length, while the section of the core may be a thousand feet or more in length. Heretofore the work of drawing into the pipe has been done by hand. The core being laid in a coil is drawn into the first section of pipe and the portion of the core not covered by the first section is again carefully formed into a coil and then drawn through the second section of pipe and a coil again formed at the end of the second section. The operation is repeated until all the core is covered. The greatest care is required in coiling and uncoiling the core to prevent kinking the wires, which are liable to be broken notwithstanding the greatest care may be exercised, and especially when the wires are quite small, as in telephone-cables.

By the use of my invention as herein described I am enabled to cover a very long core with pipe by mechanical power without the necessity of repeatedly coiling and uncoiling the core, and without injury to the conductors. I am thus enabled to manufacture telegraph-cables which are more reliable than those made heretofore, while the work is at the same time greatly facilitated.

The mechanism which I have devised to carry out my invention consists in capstans of novel construction, which may be arranged in series to draw the core through the sections of pipe. These capstans are preferably so constructed that their diameters may be diminished so as to allow the core to slip off from any one capstan. These capstans I have found it convenient to arrange horizontally in two rows near the floor, with mechanism under the floor for driving them uniformly. The sections of pipe are arranged upon the floor, the end of each section being held by a socket or holder secured in front of each of the capstans. The cord by which the core is to be pulled in is then run through all the sections of pipe and around the capstans. By starting the driving mechanism the core may be drawn directly from a reel into the pipe arranged in sections, as described. By slipping off the core from the capstans, one after the other, and bending the ends of corresponding sections of pipe, so that one may be slipped into the end of the other, the slack of core between the different sections may be taken up by starting the driving mechanism. After the core is thus covered with the sections of pipe, the joints are wiped, and then the paraffine or other insulating material may be forced into the pipe about the core, thus completing the cable. I have provided frictional pieces upon the shaft of each capstan, which are so adjusted as to clamp the hub with sufficient force to cause the capstan to move with the shaft under ordinary circumstances. If, however, the core should kink or become obstructed in its movement for any reason, the friction resistance between the friction-pieces and hub will not be sufficient to keep the capstan in motion. The reel upon which the drawing-cord is wound is also provided with similar friction devices. The core may be given one or two turns about each of the capstans. It will thus be seen that the core will not slip upon the capstans, and in case of a kink or other accidental obstruction there will be only a limited strain upon the wires, since the friction upon the capstans will not be sufficient to cause them to revolve.

I have illustrated my invention in the accompanying drawings, in which Figure 1 is a plan of my system, showing thirteen capstans placed between fourteen sections of lead pipe. The core is wound on the lower reel, and a cord attached to the end of the core passes through the sections of pipe and around the capstans in succession to the reel shown at the upper right-hand corner of the drawings.

Fig. 2 is a section of the driving mechanism upon line *x x* of Fig. 1. Fig. 3 is a plan view of one of the capstans in detail. Fig. 4 is a section thereof. Fig. 5 is a detailed view of a portion of a shaft, showing the central opening for oiling the bearings. Fig. 6 is a detailed view of the washer provided with a feathered key. Fig. 7 is a detailed view of the ratchet and lever for operating the contracting mechanism. Fig. 8 is an end elevation of the adjustable holder or socket for the pipe. Fig. 9 is a plan view thereof, showing the adjustable piece partially inserted. Fig. 10 is a longitudinal central section of the holder without the adjustable piece.

Like parts are indicated by similar letters of reference throughout the several views.

The gearing or driving mechanism *a* is placed preferably under the floor. The belt *b* runs upon a loose pulley, which is provided with a friction-clutch. This friction-clutch may be operated in any well-known way, preferably by levers placed within reach of workmen at either row of capstans. Power may thus be applied and taken off instantaneously. The capstans may thus be set in motion and stopped as desired. The core of the conductors should be formed into a coil upon the spool or reel *c*. The sections of pipe *d* may be, say, seventy-five feet each in length. The front end of each section is placed in a socket or holder, *e*. This socket may be adjusted to different sizes of pipe by inserting or removing the adjusting-pieces *e'*. (Shown in Figs. 8 and 9.) The interior of the pipe should come flush with the inner edge of the holder, so that the core may be drawn through as freely as possible while the pipe is held by the edges of the holder. The sections of pipe are placed tangent to the capstans, as shown, so that the cord and core may be drawn through them with as little friction as possible.

I will now describe my capstan in detail as shown in Figs. 3, 4, 5, 6, and 7.

The shaft *f* is driven by any suitable mechanism, as before described, turning in the bearing *g*, which may be fixed to the floor, as shown. I have provided the duct *h* for lubricating the bearing. The friction-cone *i* is keyed to the shaft, so as to always turn therewith. The hub *k* is held between the friction-piece *l* and the cone, the washer, which is provided with the feathered key, preventing the adjusting-nut *n* from being turned.

The barrel *o* of the capstan is composed preferably of four whelps carried by the pins or arms *p p'*. Links *q*, pivoted to the collar *q'*, are also provided. By means of the lever *q''* this collar may be turned, as indicated by the dotted lines in Fig. 3, and thus the circumference of the barrel may be diminished, so that the cord or core, as the case may be, may be slipped off. The ratchet *q'''* is arranged to hold the lever in any desired position. The whelps, it should be observed, are moved directly to and from the center, slipping upon the pins, as shown, when the collar is turned by the lever. By means of the adjusting-nut any desired amount of friction may be obtained between the friction-pieces and hub. The reel *r* is also provided with similar frictional mechanism, so that it may not be turned with sufficient force to strain or break the wires of the core in case the core for any cause is caught so that it cannot be drawn through the pipe.

After the core is drawn into the pipe, I bring the different sections of the pipe together in the following manner: I slip the core off from the first capstan and then bind the two ends of the sections around so that one end will be opposite the other. I then start the driving mechanism, and thus taking up the slack between the two ends of the sections of pipe the end of one section is slipped into the end of the other for a short distance. I repeat this operation at each capstan in order until all the sections of pipe are joined together and the core covered with a continuous pipe. I then wipe the joints of the pipe in the usual manner, and then force in the melted paraffine charged with gas or other insulating substances in the well known way.

I claim as my invention and desire to secure by Letters Patent—

1. The combination of capstans arranged in rows with mechanism for driving the same uniformly, and friction-devices upon the different capstans, whereby the core may be drawn simultaneously through several sections of pipe without danger of breaking the conductors, substantially as and for the purpose specified.

2. The combination, with the whelps or sections of the described barrel, of links, a collar, and lever for turning said collar, whereby the circumference of the barrel may be decreased, substantially as and for the purpose specified.

3. The combination, with the beveled barrel composed of sections or whelps, of pins radiating from the hub, which guide the sections, and means for varying the diameter of the barrel, substantially as and for the purpose specified.

4. The combination, with the shaft provided with a duct for oiling the bearings, of the friction-cone keyed to and resting upon the bearing, the hub loose upon the shaft, and means for adjusting the friction between the hub and friction-cone, whereby the core may be drawn into the pipe without injuriously straining the conductors, as and for the purpose specified.

5. Adjustable holders for the different sections of pipe, whereby said sections are held tangent to the capstans, substantially as and for the purpose specified.

6. The capstans and driving mechanism, combined with means for holding the sections of pipe substantially tangent to the capstans, respectively as and for the purpose specified.

7. The combination, with capstans arranged in rows, of mechanism for driving the same

uniformly, whereby a core may be drawn simultaneously through several sections of pipe, substantially as specified.

8. The combination, with series of capstans arranged in rows and mechanism for driving the same uniformly, said capstans being adapted to draw a core simultaneously through several sections of pipe, of means for reducing the diameter of each of said capstans, whereby the said core may be removed from said capstans successively, and the ends of the respective sections of pipe brought together over said core, substantially as set forth.

In witness whereof I hereunto subscribe my name this 24th day of July, A. D. 1883.

WILLIAM R. PATTERSON.

Witnesses:
H. B. THAYER,
W. A. KREIDLER.