

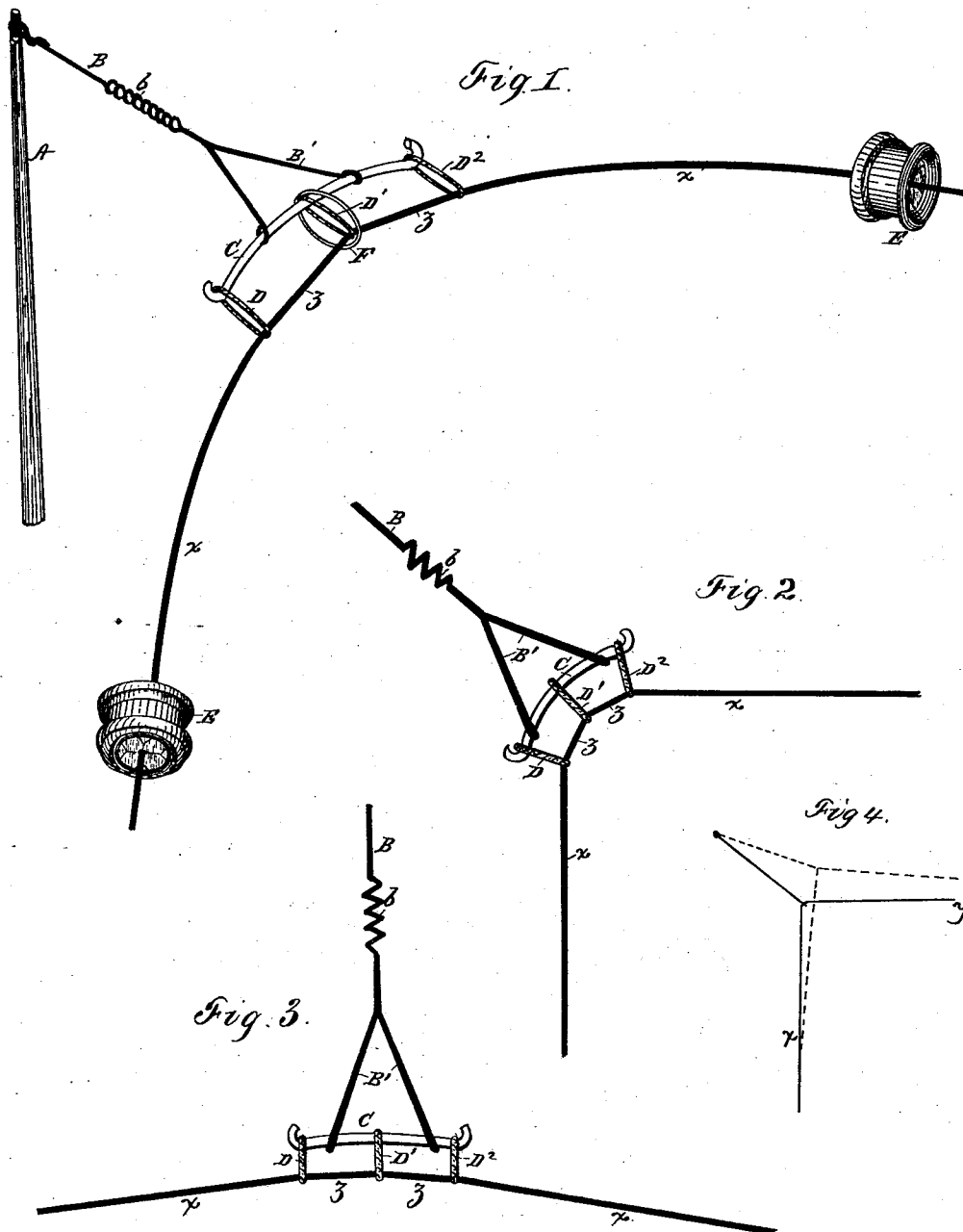
(No Model.)

G. F. SHAVER.

ANGLE HANGER FOR MECHANICAL TELEPHONE LINES.

No. 278,750.

Patented June 5, 1883.



Witnesses

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ANGLE-HANGER FOR MECHANICAL-TELEPHONE LINES.

SPECIFICATION forming part of Letters Patent No. 278,750, dated June 5, 1883.

Application filed July 17, 1882. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. SHAVER, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Angle-Hangers for Mechanical-Telephone Lines; 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 appertains to make and use the same.

This invention relates to devices for suspending the wires of mechanical telephones; and it consists in providing a new and improved angle-fastener.

In suspending the wires of mechanical telephones it is necessary that they be so adjusted that they will remain taut during the various changes in the temperature. This is a very difficult thing to do, especially when the line has to change its direction. It is not only difficult to draw a straight line taut and keep it so, but when the line has to pass around corners of streets and make various other angles and curves it becomes very difficult to put it up taut and keep it so. For example, we will suppose a line runs along the north side of an east-and-west street, and then turns off onto the east side of a north-and-south street, and that the corner it runs around is occupied by a high block of buildings. What will be the result? Until about twelve o'clock, noon, that part of the line on the east side of the north-and-south street is in the shade, while that part on the north side of the east-and-west street is exposed to the direct rays of the sun; hence the temperature on one side of the corner-fastening is high and on the other low, and that section which is in the heat will expand, while the other section will not. It will not do to let the wire sag to take up the expansion, for that will destroy the sound conducting or vibrating power of the line. The slack or expansion must be taken up by the corner hanger, and this in such a way as to not in any way slacken the section of the line which is not expanded by the heat. The same difficulty arises in the operation of the telephones upon the line, regardless of expansion or contraction arising from the temperature. When the diaphragm of a transmitting-instrument in a mechanical telephone is vibrated, the vibra-

tions are carried to the receiving-instrument by the longitudinal movement of the wire, as well as by molecular movement of the wire. So far as the molecular movement is concerned, it is impaired if the wire is bent abruptly at right angles or an acute angle, for the fiber of the wire is changed in density at that point. So far as the longitudinal movement of the wire is concerned, the device which will properly prevent slack, by reason of expansion, will properly carry such vibration around the corner. A right-angle bend in the wire, or any angle other than an obtuse, (and the more obtuse the better,) will not permit a vibration or an expansion to be properly adjusted or communicated. A simple obtuse bend in the wire is not sufficient. It must also be properly suspended and provided with a proper degree of flexibility in its suspension. From the diagram Figure 4 in the drawings hereto attached, the effect of an ordinary fastening is shown. The dotted lines show the effect of an expansion or endwise movement of the wire *x* upon the wire *y*. It will be seen that an endwise movement of *x* produces less than half as much endwise movement in the wire *y*. Now, if in conveying a sound the wire *x* has to move lengthwise the thousandth part of an inch, the wire *y* will only move half as far, and hence the receiving-instrument on the wire *y* will vibrate with only half the power it would if the wire were straight, or the angle properly adjusted so that there would be no lost motion.

The object of this invention is to provide an angle-fastening which will overcome fully, or as nearly so as possible, the above-named obstacles and defects.

My device is illustrated in the accompanying drawings, as follows:

Fig. 1 is a perspective view, and represents a line suspended by one of my improved hangers. Fig. 2 is a plan showing the hanger holding the wire for a right-angle turn. Fig. 3 is a similar view, showing the hanger holding the wire for a slight deflection in its course. Fig. 4 is a diagram illustrating the ordinary way of hanging the wire.

The letters of reference indicate parts as follows:

A is the post or other point to which the hanger is attached.

B is the wire or guy by which the hanger is

connected to the post, and forms a part of the hanger, in fact. It is composed of the single wire B, the two branches B' B', and the spring b.

$x y z x$ represent the telephone-line. C is a cross-bar forming part of the hanger, and D D' D² are cords connecting the wire or line with the cross-head.

E E represent the telephones.

The construction can be easily understood from the drawings. The bar C may be a rigid bar; or it may be made of flexible material. I prefer the latter, as when so made they may all be alike, as they will bend to accommodate themselves to the angle, while if made rigid various forms will have to be made to suit various angles. For instance, that in Fig. 3 would have to be one form, while that in Fig. 2 would be another form; but when made of flexible material they will conform to the various angles. The line $x y z x$ is attached to the bar C by cord-loops similar in every respect to those now in common use.

F is a safety-loop of strong wire put in the middle of the bar C and around the line. Ordinarily it does not serve any purpose as a fastening for the wire; but if the cord-loops should break, the loop F will prevent the wire or line from falling. As cord-loops have been found preferable for suspending the wire, and as they are liable to become broken, it follows that a safety-loop will often be of very great service. There are three cord-loops on each bar. Often two are sufficient; but enough should be used to prevent the line being bent at any other than a very obtuse angle. As shown in Fig. 2, a right-angle turn can be made in the line, with three loops, D, in use, and only bend the line slightly at any one point. By studying the angles shown in this figure with reference to the movements shown in Fig. 4 it will at once be seen that the difficulties shown to exist in Fig. 4 do not exist in the construction shown in Fig. 2 or the other figures. For instance, an endwise movement toward the hanger on line x in Fig. 2 of, say, one-sixteenth of an inch will move the line y lengthwise almost precisely the same distance, and so of the line z . The space D y D' C will change its form slightly, but the line y will move practically as far as the line x did. I have found by actual use in a large number of lines I have put up that the sound-vibrations will pass along a line thus put up perfectly. I have put up a line with five right-angle turns in it and found it to work perfectly. By further curving the bar C and using more loops D, I have been

able to make a return-line operate perfectly. So far as sound-vibrations are concerned, the bar C could be held rigid; but in order to take up the expansions and provide for the contractions in the line incident to temperature, I connect the bar C to the post or other point of attachment by a wire, B, having therein a spring-coil, b, by which I obtain an automatic tension on the line at the angle. There are various ways by which this automatic tension can be obtained, which will quickly suggest themselves to a mechanic, and I therefore do not want to be limited to any precise means, but prefer the one shown. The branches B' B' prevent the bar C from swaying pivotally on its guy, which is very essential.

I am aware that a fastener has been made consisting of a cross-head with two loops, which was connected to the post by a single wire which passed through an eye in the middle of the cross-head, thus forming a pivot at that point. The above construction is found in Patent No. 238,740, issued to H. Willard, March 8, 1881. I am also aware of the construction shown in Patent No. 218,707, August 19, 1879, issued to Billings and Maxwell, wherein is shown a branched guy; but it must be observed that the branches of this guy stand vertical and in no way prevent the angle-holder turning pivotally horizontally on its guy, and so the object sought by my device is not there present. Therefore I do not claim as my invention such constructions; in fact, the results attained by my construction cannot be attained by them.

What I claim as new is—

1. In a hanging device for mechanical-telephone lines, a bar, C, with loops for holding the line-wire, which is secured to the post or other support by guy-lines extending from points on said bar, each side of the middle thereof, whereby said bar is prevented from turning pivotally on its guy within the plane of the line-wire, substantially as shown.

2. In a hanging device for mechanical-telephone lines, a curved bar, C, with three or more loops, D D' D², placed at sufficiently near intervals on said bar to hold the line-wire approximately parallel with said bar, substantially as shown, and for the purposes mentioned.

In testimony whereof I affix my signature in presence of two witnesses.

G. F. SHAVER.

Witnesses:

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