(No Model.) 2 Sheets—Sheet 1.

G. F SHAVER.

MECHANICAL TELEPHONE EXCHANGE.

No. 266,056. Patented Oct. 17, 1882.

Fig. 1.

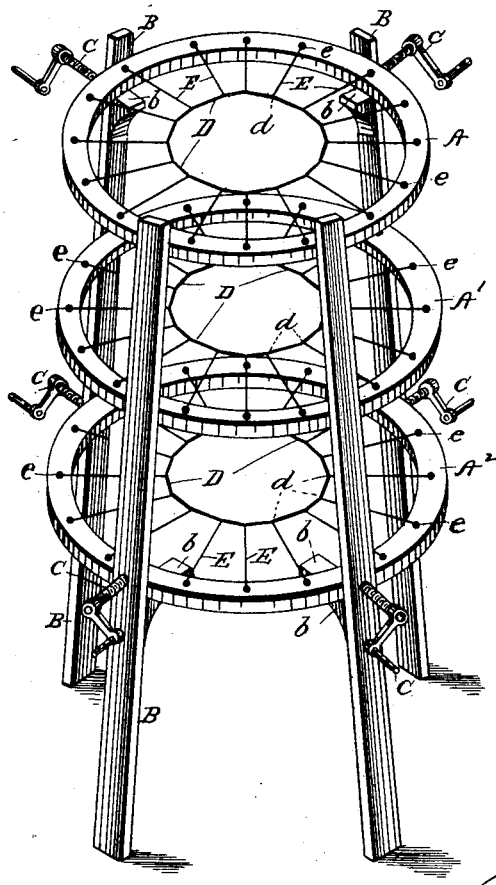


Fig. 5.

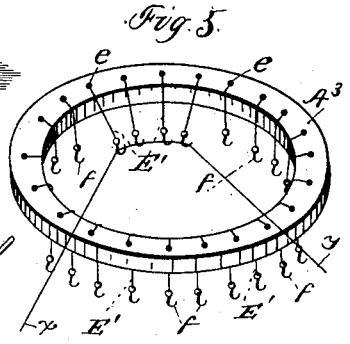
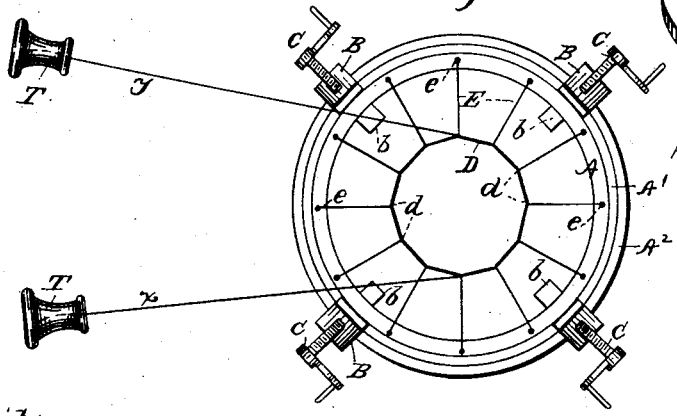


Fig. 2.



Witnesses.
W. R. Edelen
M. A. Edelen

Inventor.
George F. Shaver
Per Wallbridge & Wallbridge
Att's

(No Model.)

2 Sheets—Sheet 2.

G. F. SHAVER.

MECHANICAL TELEPHONE EXCHANGE.

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Fig. 3.

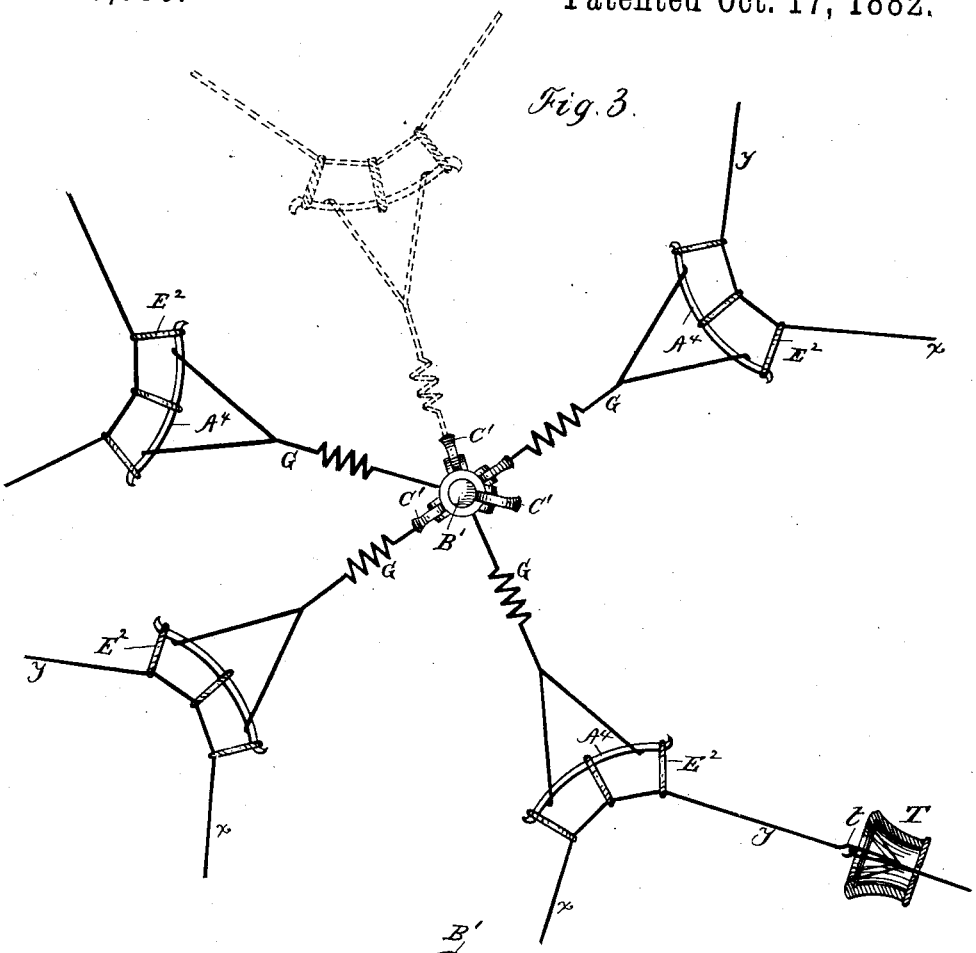
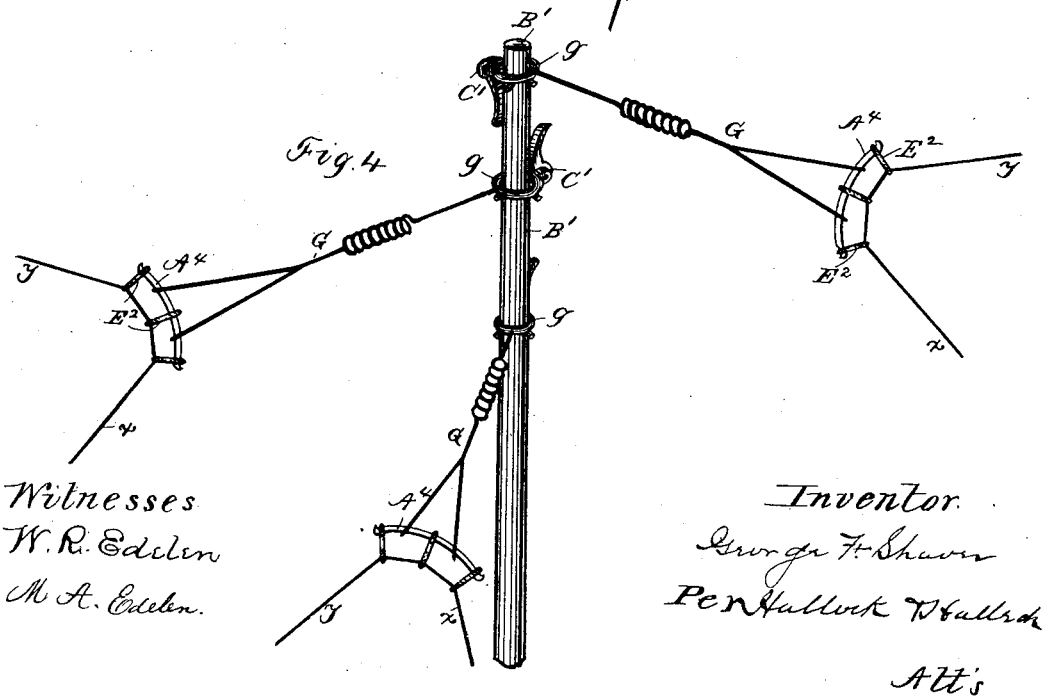


Fig. 4



Witnesses
W. R. Edelen
M. A. Edelen.

Inventor.
George F. Shaver
per Hallock & Hallock
Att's

UNITED STATES PATENT OFFICE.

GEORGE F. SHAVER, OF ERIE, PENNSYLVANIA.

MECHANICAL TELEPHONE-EXCHANGE.

SPECIFICATION forming part of Letters Patent No. 266,056, dated October 17, 1882.

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 Mechanical Telephone-Exchanges; 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 consists in providing means for establishing a central station for mechanical telephone-lines.

So far as I am aware, a system of mechanical telephone-lines with a central station has heretofore not been established, and for this reason the use of such telephones has been very limited. It is well known that mechanical telephones are very efficient as sound-conveyers; but as their use has been limited to a single wire or line they have not gone into as general use as they would have done had they been considered as capable of operation in a general system with a central station, as are electric telephones. The means which are essential in order to establish a system of mechanical telephone-wires with a central station are naturally as follows: means for hanging the wire so as to turn abrupt angles without affecting the conduction of sound, so that all the lines can be carried to a common point or station, and so that any one of these converging lines may be connected with any other one in such a manner as to make the communication perfect from any one line to another; also, means whereby three or more of the lines can be connected together, so that a person at the end of one line can communicate with persons at the ends of two or more lines at the same time. A system of wires having these means would be adequate for all general requirements. Much of the success of such a system must depend upon the line-hanger or angle-hanger, for without this being efficient the central station could not be approached and entered by but few lines in cities or large towns; but the device by which various of the converging lines can be connected (which device, in electrical telegraph or telephone parlance, is known as a "switch-board," and therefore may with propriety be so named here) constitutes the really essential feature of a central station.

In another application for a patent I have shown an angle-hanger, which fills the requirements above named, as essential for erecting the system of wires and conducting them all to a central office. In order to construct a proper switch-board for use at the central office, I have simply embodied the principles on which the angle-hanger works in a mechanism capable of performing the functions required. In one sense this switch-board is a mere elaboration of the angle-hanger. I have shown in the accompanying drawings various modifications, but they all are based on the same initial principle. In fact, I do not conceive how a switch-board for a central office or station for this class of telephones can be constructed which does not embody in some form this feature— viz., the elaboration (more or less) of an angle-fastening which divides the angle into a series of obtuse angles.

My invention is illustrated in the accompanying drawings as follows: Figure 1 is a perspective view of a series of switch-boards arranged in a common rack or frame. Fig. 2 is a top view of the device shown in Fig. 1. Fig. 3 is a plan view of a switch-board formed of a series of angle-fastenings attached to a central post. Fig. 4 is a perspective of the device shown in Fig. 3. Fig. 5 is a perspective view, showing a modification of the switch-board shown in Figs. 1 and 2.

The devices shown in Figs. 1 and 2 I consider the most practicable. That shown in Fig. 5 is nearly the same, and that shown in Figs. 3 and 4, while perfectly practicable, is not as efficient when a large number of changes are made. However, much depends upon the form of the room occupied by the station and the arrangement of the converging lines; but it should be remarked that the form shown in Figs. 1 and 2 is universal in its application.

Before going further it should be remarked that the various lines converging at the central station terminate in that station and are each supplied with a telephone. The best arrangement is for all these telephones to be arranged in rows around the room, but they may all be banked upon one side of the room. They should all be easily accessible for use by the

attendant. The wire in each of these telephones passes through the diaphragm and terminates in a hook, (see T, Fig. 3.) The switch-board should occupy a central position in the room; or if all the telephones are banked on one side of the room the switch-board should occupy a central position opposite them, or in front of them.

Let us now suppose that A desires to communicate with B. He will call the central office, and the attendant will go to the telephone on the end of his wire and ask what is wanted, and will be informed that communication with B is desired. The attendant will then hook onto the hook on A's telephone a wire that connects with the switch-board, and also connects B's telephone to the switch-board. The connection, when made, will be like that shown by the wires *x* and *y* in Figs. 2, 3, 4, and 5.

The switch-board shown in Figs. 1 and 2 is constructed as follows: A is a hoop, of wood or metal, as desired. A series of guys, E E, &c., are connected with this hoop, and run toward the center, like spokes. They may be of wire or cord. They all connect with a ring, D, of wire, which should probably be about the size of the line-wire. The guys E are drawn tight evenly all around. The hoop A is held firmly in a frame-work, B B B, by clamping-screws C, resting, however, on brackets *b b*, &c. A little play being allowed within the frame, the hoop can be thrown from side to side slightly before clamping it. The wires *x* and *y* connect with the ring D at the angles *d* formed by the guys. This connection can be made by a hook or otherwise, and there may be as many of these wires as there are angles, if desired; but I prefer to have them hook on and then use only as many as are needed at a time. As shown in Fig. 2, the two telephones in communication are on the same wall of the office and near together. If they were on opposite walls, the line *y* would be connected to the ring D near the point where the wire *x* is attached. Wherever the telephone to which *y* connects may be located, that wire should be placed so that it would run tangent to the hoop in an opposite direction—that is, so that its tension will oppose the tension of the wire *x*. Now, it will be seen that a vibration lengthwise on the line *x* will be communicated to the ring D, which in turn will give it to the line *y;* or, in other words, the lines *x* and *y* and the ring D form a continuous line passing around a very abrupt or acute angle, which turn is divided into a series of obtuse angles. Now, in place of the wheel an angle-hanger could be used, as shown in Figs. 3 and 4; or the ring D can be omitted and the guys E be provided with hooks and the wires *x* and *y* be joined and put into the hooks on the guys, as is shown in Fig. 5. This is all the modification in Figs. 3, 4, and 5 amounts to. The angle-hangers shown in Figs. 3 and 4 are the same as those shown in the application for a patent above referred to. After the wires *x* and *y* have been attached to the switch-board properly they must be drawn taut. This may be done by the adjustment of the hoop in the frame by the screws C, or some similar device by which the hoop can be firmly held at one side of the frame-work; or the wires may be provided with devices for tightening them. In the construction shown in Figs. 3 and 4 the cams C′ are intended to serve the purpose of tightening the lines after connection. A third or fourth or more lines can be connected with the ring D and receive the message passing over *x* and *y*, if it should be desired to put so many lines in intercommunication. By having several hoops, as in Fig. 1, or several angle-hangers, as shown in Fig. 3, several pairs of lines may be put in communication at the same time.

What I claim as new is—

1. In a system of mechanical telephone-lines, the combination, with a series of converging lines at the point of convergence thereof, of the following elements: a series of telephones which are severally connected with the said several converging wires, and are provided with means, substantially as shown, for connecting therewith an extension-line, an angle-hanger located centrally with relation to said converging lines and their attached telephones, and, finally, the lines *x* and *y* for connecting two of said telephones together through said angle-hanger, substantially as and for the purposes set forth.

2. In a system of mechanical telephone-lines, the combination, with a series of converging lines at the point of convergence, of an angle-hanger located centrally with relation to said line termini, which is provided with branch lines *x* and *y*, which can be attached and detached from any of said line termini, and thereby form a circuit with any two of said lines, substantially as and for the purposes set forth.

3. A universal angle-hanger for use as a switch-board for a system of mechanical telephone-lines, which consists of a hoop, A, guys E, and ring D, arranged together, substantially as and for the purposes set forth.

4. In a system of mechanical telephone-lines, the combination of a universal angle-hanger constructed substantially as herein shown, and mounted in a frame, with means, substantially as shown, for securing the same at various points within said frame for the purpose of drawing the connected lines taut, as set forth.

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

G. F. SHAVER.

Witnesses:

JNO. K. HALLOCK,

W. R. EDELEN.