

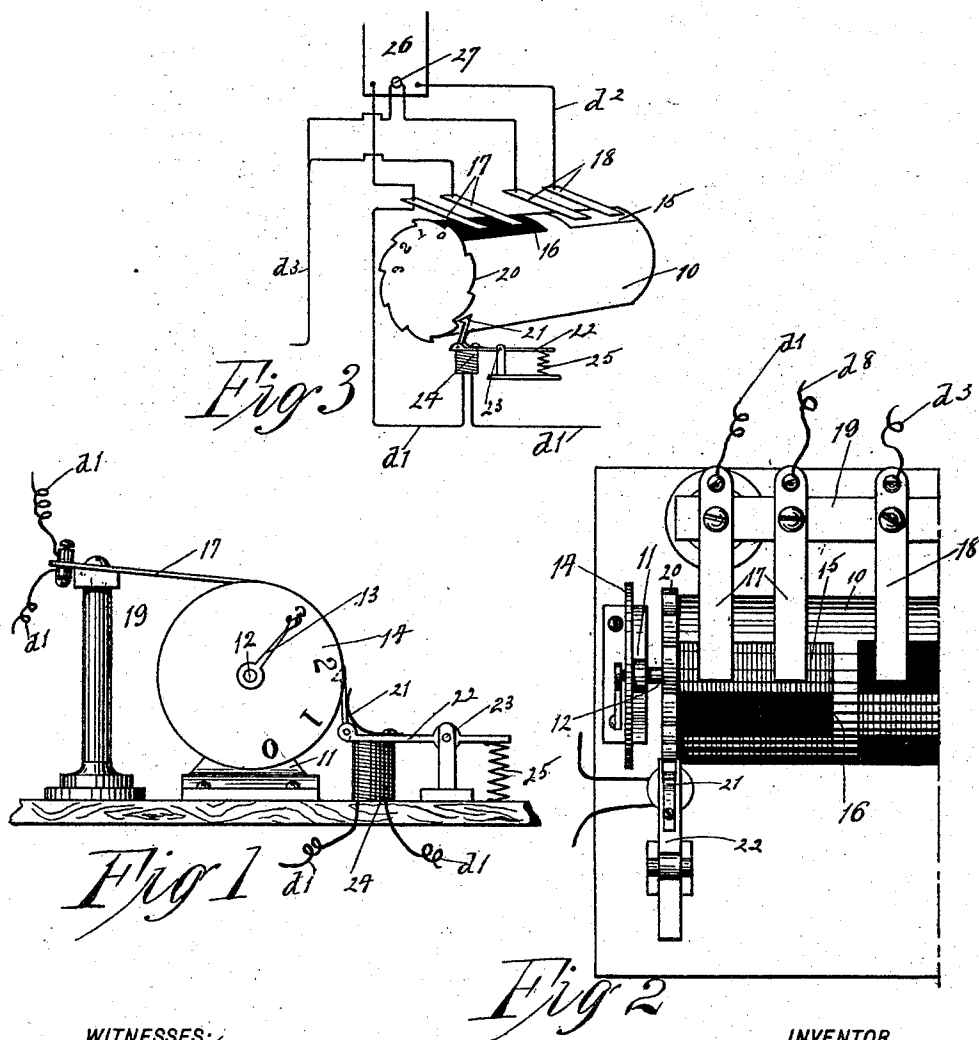
(No Model.)

2 Sheets—Sheet 1.

A. F. SWAN.
TELEPHONE SYSTEM.

No. 572,840.

Patented Dec. 8, 1896.



WITNESSES:
Guthrie Saunders
Burke L. Dyer

INVENTOR
Alfred F. Swan
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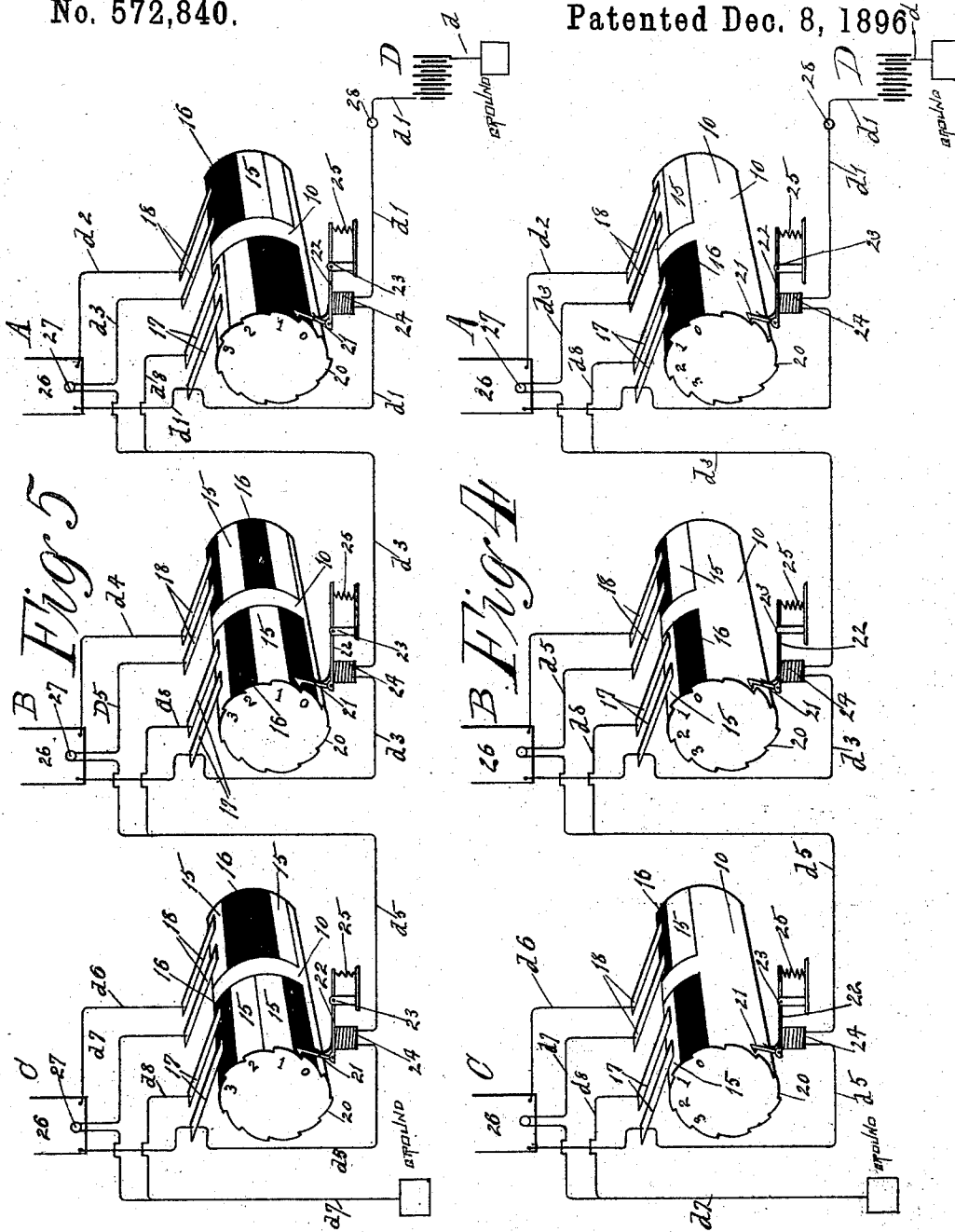
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UNITED STATES PATENT OFFICE.

ALFRED F. SWAN, OF BAYONNE, NEW JERSEY.

TELEPHONE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 572,840, dated December 8, 1896.

Application filed July 11, 1895. Serial No. 555,594. (No model.)

To all whom it may concern:

Be it known that I, ALFRED F. SWAN, of Bayonne, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Telephone Systems, of which the following is a full, clear, and exact description.

My invention relates to improvements in telephone systems, and the object of my invention is to provide means in connection with any ordinary telephone instruments whereby several parties or instruments may be arranged on a line and any desired instrument cut in to the circuit while the others are at the same time cut out, so that either party on the line can carry on a conversation without fear of being heard or interrupted by other parties on the line.

A further object of my invention is to make the apparatus by which the above result is accomplished as simple and durable as possible, to the end that the system may be cheaply constructed and used without difficulty.

To these ends my invention consists of a telephone system the construction and arrangement of which will be hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of the apparatus used in connection with each telephone instrument to effect the proper shunting of the current. Fig. 2 is a broken plan view of said apparatus. Fig. 3 is a diagrammatic view showing the arrangement of the switch barrel and brushes. Fig. 4 is a diagrammatic view showing the system as arranged on a three-party line and with one telephone instrument in circuit and the others on the line cut out; and Fig. 5 is a view similar to Fig. 4, but shows a different arrangement of the circuit whereby a different instrument is in position for use.

In connection with each telephone instrument a rotary switch-barrel 10 is used, which is mounted on suitable supports 11 and has its shaft 12 provided with a hand or pointer 13, adapted to move opposite a dial 14 at one end of the switch-barrel, and as the switch-barrels on all the instruments of a party line

are simultaneously and similarly moved, as will hereinafter appear, it will be seen that the hand and dial will indicate which of the instruments on the line is in use.

The switch-barrel 10 is provided near opposite ends with a series of circuit making and breaking surfaces 15 and 16, the former being of conducting and the latter of non-conducting material, and the switch-barrel turns in contact with conducting-brushes 17 and 18, which are arranged in pairs, as the drawings clearly show, and are fastened to suitable supports 19. The conducting and insulating surfaces 15 and 16 of the different series of such surfaces, that is, at the two ends of the barrel 10, are arranged in relation to each other and to the brushes 17 and 18 so that when a pair of brushes 17 is on an insulating strip or surface at one end of the barrel the pair of brushes 18 will be on a conducting strip or surface.

A plurality of conducting and insulating strips on each end of the switch-barrels is necessary in order that the telephones may all be in circuit when at normal position or at zero, so that any telephone can be rung up at the central office, and also enable each telephone to be in circuit when its switch-barrel is turned and its call-bell rung. If it were not for this plural arrangement of the conducting and insulating strips, each telephone would be out of circuit as soon as the switch-barrel turned.

This system is particularly desirable in suburban localities, and the plural arrangement of conducting and insulating strips referred to enables two parties whose relations may be intimate to place themselves in circuit and cut the others on the line out with great facility. For instance, supposing there are four or five telephones on a party line, the insulating and conducting strips of two of them, say No. 2 and No. 5, can be arranged so that both such instruments will be in circuit at the same time and so the operator at the central station can step both switches around, as hereinafter described, until both are in circuit, when conversation can be carried on without being heard at the other stations. By having the instruments at zero when not in use much time is saved in making the daily morning tests, as is now the prac-

tice, for in this case it is not necessary to test each instrument separately and consecutively.

Each switch-barrel has at one end a ratchet-wheel 12, which is engaged and turned by a pawl 21, carried by an armature 22, which is pivoted, as shown, at 23, and is pulled in one direction by a magnet 24 and in the opposite direction by a spring 25, this arrangement being substantially like that of an ordinary telegraph-sounder and capable of the usual modification. The operation of this part of the apparatus is apparent, that is to say, the energizing of the magnet 24 causes the pawl 21 to be pulled down and so turns the ratchet-wheel, while the deenergizing of the magnet liberates the pawl and permits the spring 25 to lift it the distance of a tooth on the ratchet-wheel. Hence the making and breaking of the circuit will cause the ratchet-wheel and switch-barrel to be turned, the distance depending on the number of the makes and breaks.

Each shunting or switch apparatus is used in connection with an ordinary telephone 26, which is provided with a push-button 27 of the usual kind, and the circuit is controlled by a push-button 28 at the central office. As illustrated, the circuit is a closed one and is opened by pushing either the button 27 or 28.

The drawings show three stations A, B, and C on a line, and the connections are as follows: A battery D connects by a wire d with the ground and by a wire d' with the push-button 28, magnet 24 of telephone A, and with the telephone apparatus in the usual way. The wire d' also connects with one of the brushes 17 of telephone A. From the telephone A a wire d^2 leads to one of the brushes 18, and from the second brush 18 leads a wire d^3 , connecting with the push-button 27 of telephone A, the magnet 24 and one of the brushes 17 of telephone B, and also with the said telephone B. From the telephone B a wire d^4 leads to one of the brushes 18 of the switch-barrel 10 of the said telephone, and from the second brush 18 the wire d^5 connects with the push-button 27 of the telephone B, the magnet 24, and one brush 17 of telephone C, and with the telephone C. The telephone C connects, by a wire d^6 , with one brush 18 of telephone C, and the second brush 18 connects, by a wire d^7 , with the push-button 27 of telephone C and with the ground. The leading-wires d^3 , d^5 , and d^7 connect, by branch wires d^8 , with the second brushes 17 of the respective telephones, and thus provision is made for a complete circuit, and it will be noticed that this arrangement can be carried out to any necessary extent, so that any desired number of telephones within reasonable limits may be arranged on a single line.

The instruments are normally at zero and in circuit, and when any instrument is to be placed in use a sufficient number of pulsations is set through the line to turn the switch-

barrel of the desired instrument into position to cut in said instrument and cut out the other instruments; for instance, as illustrated, telephone A is No. 1, B No. 2, and C No. 3. Now if telephone A is to be placed in circuit from the central station the operator pushes the button 28 so as to break the circuit and permit pawl 21 to rise, and then releases it and the circuit is closed, the magnet 24 of each instrument energized, and all the switch-barrels turned the distance of one tooth on the ratchet-wheel 20. The circuit will then be as follows (see Fig. 4): From the battery D through the wire d to the ground, and from the battery through the wire d' , the push-button 28, the magnet 24 to the telephone A, the current being cut out from the brushes 17 of telephone A because the said brushes are on an insulating-surface 16 of the switch-barrel 10. From the telephone A the circuit continues through the wire d^2 , one of the brushes 18, a conducting-surface 15 of the switch-barrel of telephone A, the second brush 18 of telephone A, the wire d^3 , the push-button 27 of telephone A, the magnet 24 of telephone B, one of the brushes 17 of telephone B, a conducting-surface 15 of the switch-barrel, the second brush 17 of telephone B, the wire d^4 of telephone B, the wire d^5 , the magnet 24 of telephone C, the brushes 17, the conducting-surface 15 of the switch-barrel of telephone C, the wire d^6 , and the wire d^7 to the ground.

If telephone B, or No. 2, is to be rung up, the switch-barrels are turned two notches, and if telephone C is to be placed in circuit the switch-barrels are moved a distance of three notches by making the necessary makes and breaks in the line, and in the latter instance the instruments or switch-barrels assume the position shown in Fig. 5, which brings the brushes 18 of telephones A and B upon the insulating-surfaces 16 of their respective switch-barrels, thus cutting out the said instruments, and brings the brushes 18 of telephone C into contact with a conducting-surface of the switch-barrel of telephone C, thus cutting in the said telephone, and the circuit is then as follows: From the battery D, through the wire d , to the ground, and from the battery, through the wire d' , the push-button 28, the magnet 24, the brushes 17 and switch-barrel 10 of telephone A, the wire d^2 of telephone A, the wire d^3 , the magnet 24, the brushes 17, and conducting-surface of the switch-barrel of telephone B, the wire d^4 of telephone B, the wire d^5 , the magnet 24 of telephone C, the telephone C, the wire d^6 , one of the brushes 18 of telephone C, a conducting-surface 15 of telephone C, the second brush 18 of telephone C, and the wire d^7 , through the push-button 27 of telephone C, to the ground. From the foregoing description and by reference to Figs. 4 and 5 it will be observed that the brushes 17 serve to cut the instruments out of circuit and that the brushes 18 serve to cut the instruments in circuit.

It will be noticed that the movement of the switch-barrels is made by makes and breaks in the circuit, and consequently the movement can be effected by operating either the push-button 28 or one of the push-buttons 27.

After using the instruments the push-button is manipulated at the central office so as to make the necessary makes and breaks to cause the instruments to all be turned back to zero.

It will be understood that the connections at the central office to connect one party line with another may be of any usual kind, and hence no illustration or description of such mechanism is here presented.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

A telephone system, comprising a series of telephones in circuit, a switch-barrel for each telephone, each switch-barrel having at its ends a plurality of insulating and conducting strips, the insulating-strips of one end being out of alinement with the insulating-strips of the other end, two pairs of brushes for each switch-barrel, one being arranged to cut the telephone in and the other to cut it out of circuit, a pawl-and-ratchet mechanism operated by makes and breaks in the circuit to turn each switch-barrel, and means as a push-button for making and breaking the circuit, all substantially as described.

ALFRED F. SWAN.

Witnesses:

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WARREN B. HUTCHINSON.