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W. W. DAVIS.

TELEPHONE SYSTEM.

No. 586,529. Patented July 13, 1897.

Fig. 1.

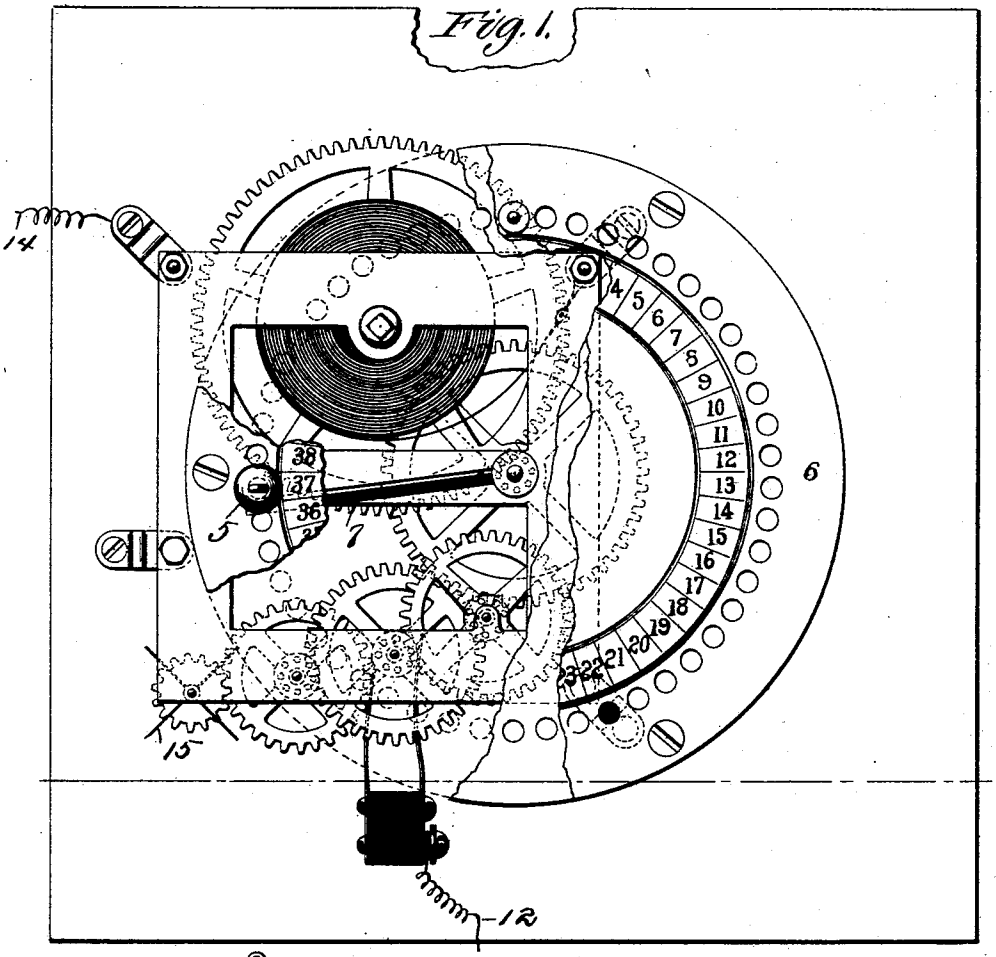


Fig. 2.

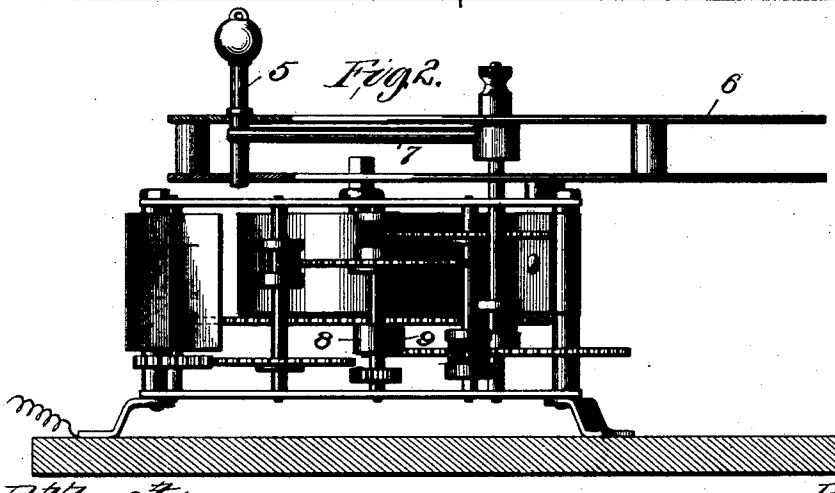
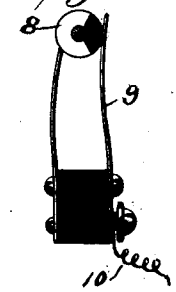


Fig. 2a.



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TELEPHONE SYSTEM.

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Fig. 3.

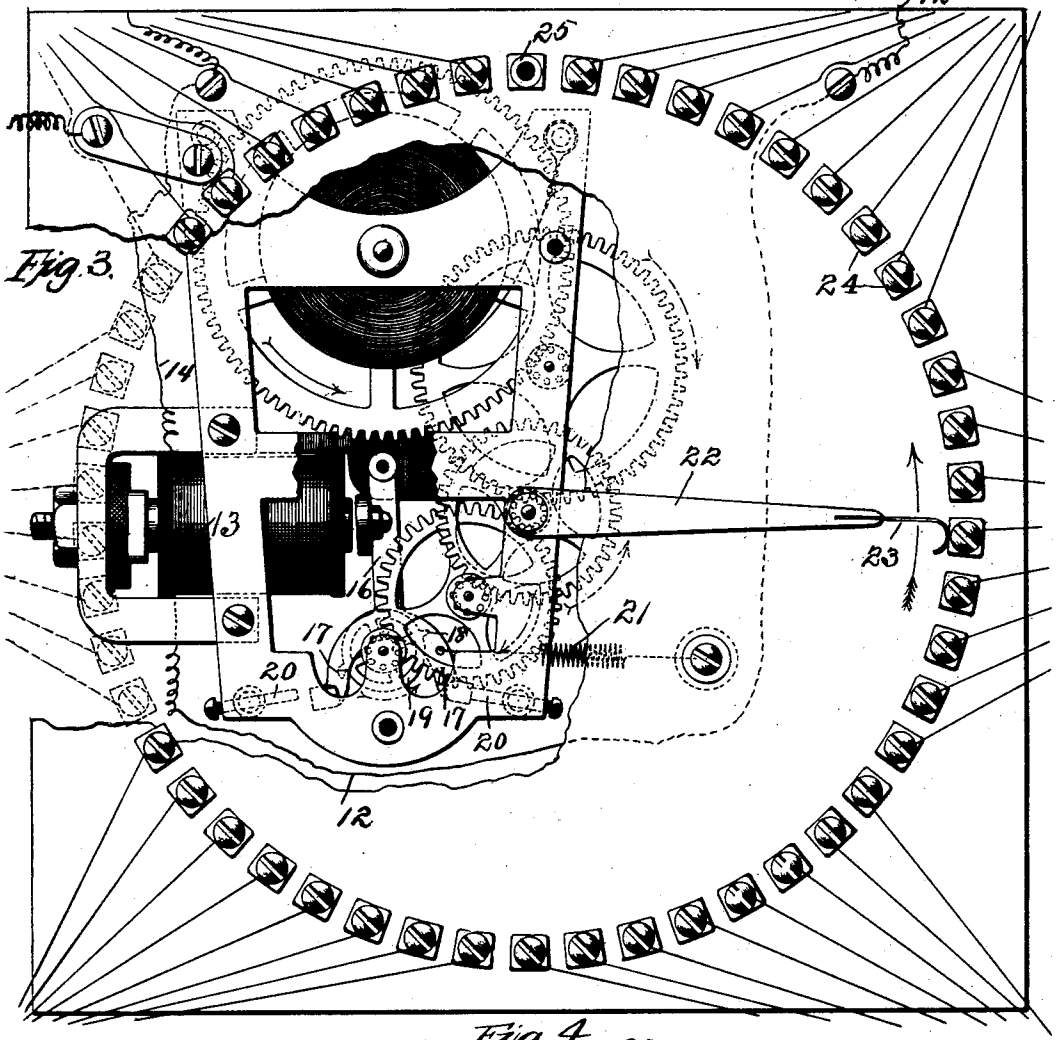

Fig. 4.

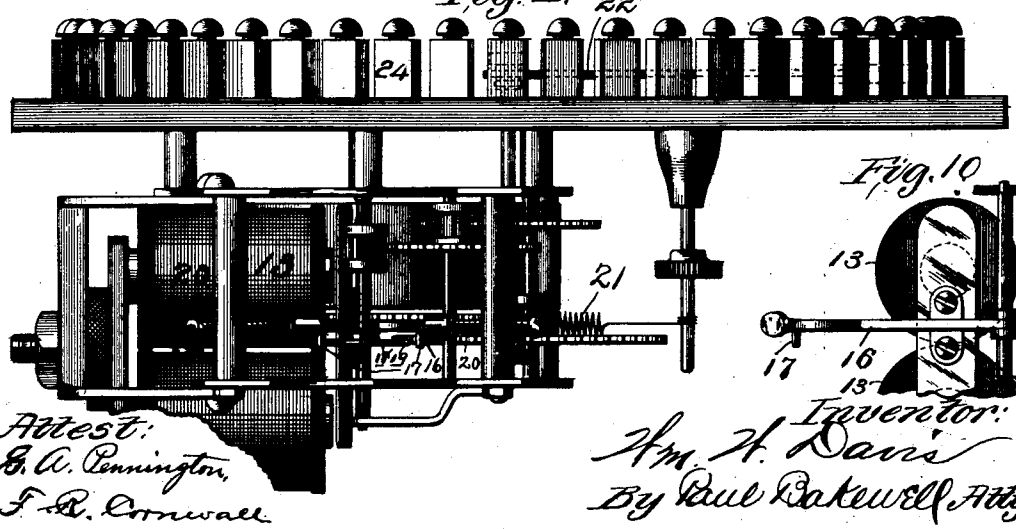

Fig. 10.

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Fig. 5.

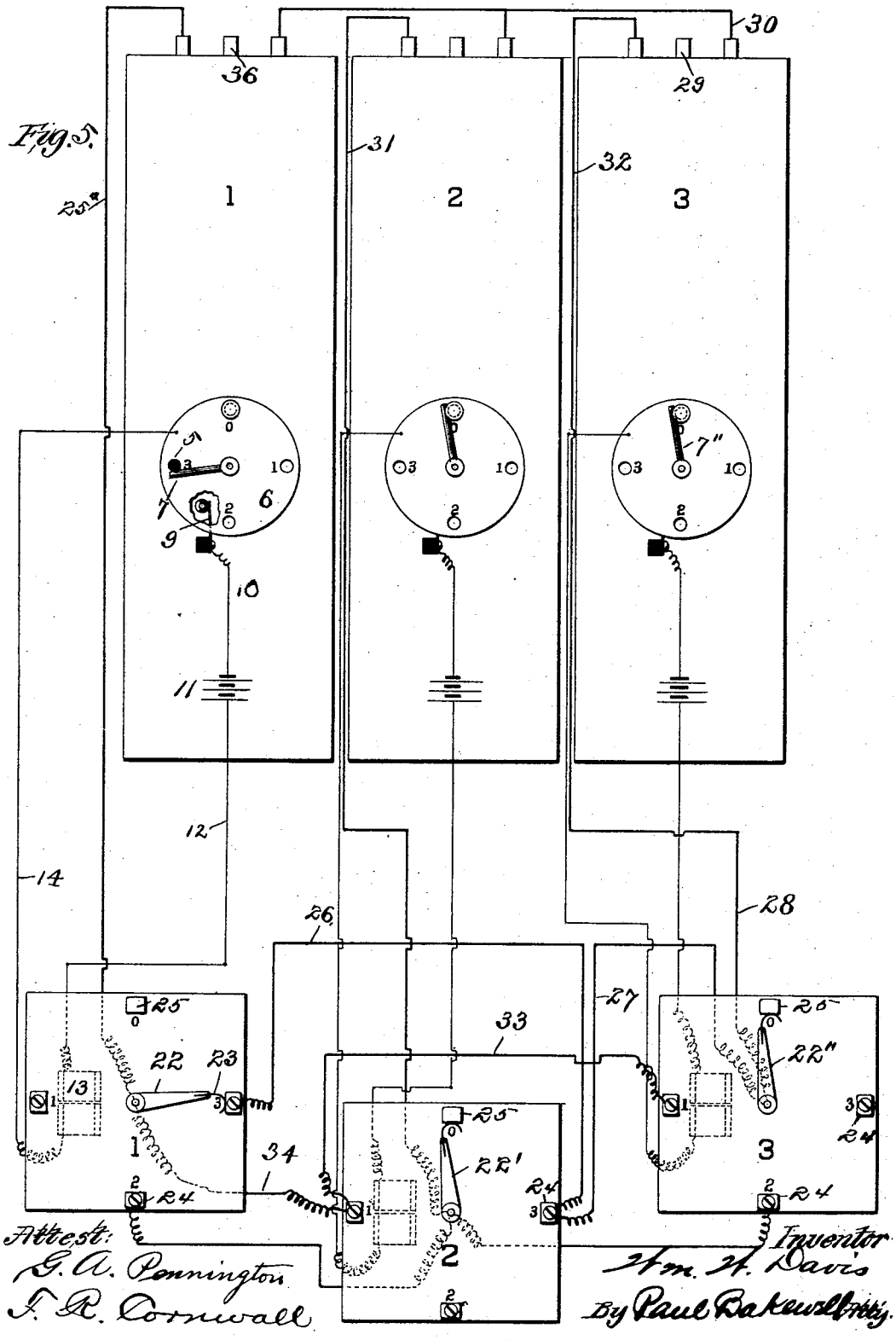

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Fig. 6.

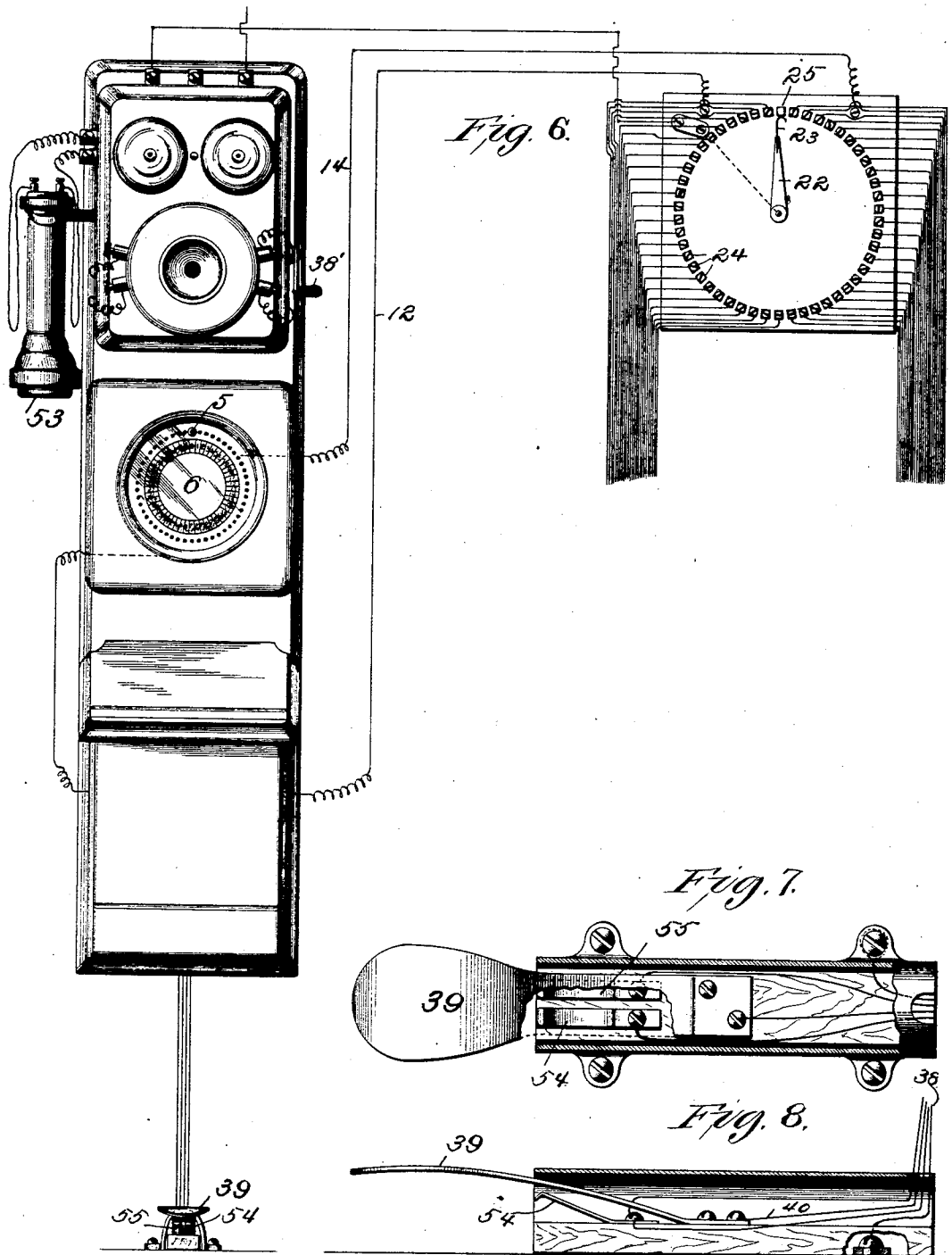

Fig. 7.

Fig. 8.

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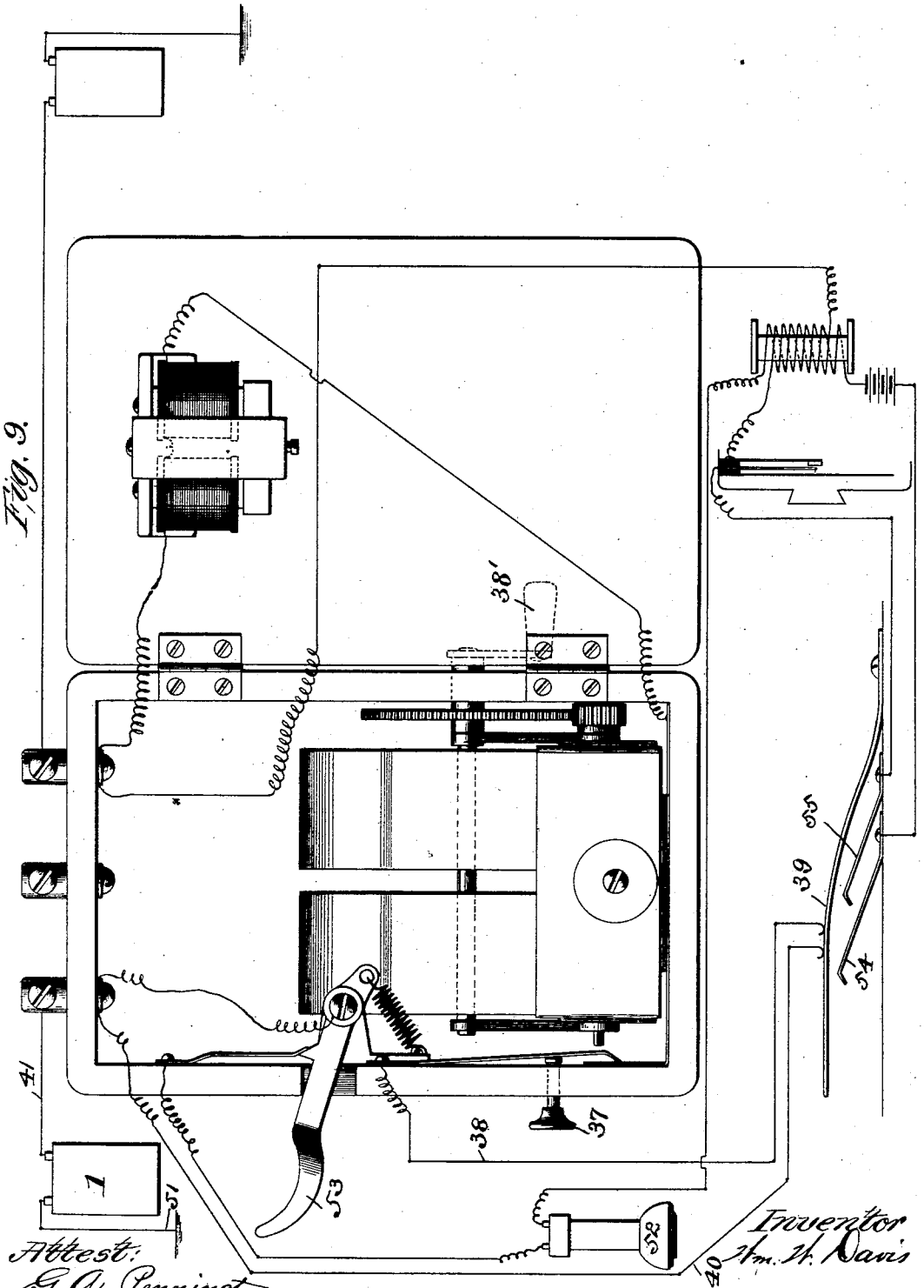
Fig. 9.



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Atty.

UNITED STATES PATENT OFFICE.

WILLIAM W. DAVIS, OF ST. LOUIS, MISSOURI.

TELEPHONE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 586,529, dated July 13, 1897.

Application filed September 5, 1896. Serial No. 604,924. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. DAVIS, a citizen of the United States, residing at the city of St. Louis, State of Missouri, have invented a certain new and useful Improvement in Telephone Systems, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, wherein—

Figure 1 is a plan view illustrating the calling mechanism which is located at a station. Fig. 2 is a side elevational view of the same. Fig. 2ª is a detail view of the contact making and breaking device at the outlying stations. Fig. 3 is a plan view of the contact mechanism which is located at the central exchange. Fig. 4 is a side elevational view thereof. Fig. 5 is a schematic view illustrating the wiring of three stations, in which station 1 has called station 3 and the two are in communication. Fig. 6 is a view illustrating the adaptation of a pedal-switch which is combined with the hook-switch as used in connection with my invention. Fig. 7 is a top plan view of the pedal-switch. Fig. 8 is a longitudinal sectional view therethrough. Fig. 9 is a view illustrating the circuits, showing the use of my improved pedal-switch. Fig. 10 is a detail view of the magnets, armature, and yoke.

This invention relates to a new and useful improvement in telephone systems, the object being to provide the several stations with means whereby said stations are enabled to call up another station without the necessity of an attendant at the central exchange.

With this object in view my invention consists in providing suitable mechanism at the several stations whereby upon the insertion of a suitable stop to arrest the mechanism at a certain point said mechanism makes and breaks contact, so that a magnet at the central exchange is energized to cause a step-by-step revolution of the contact-making arm with the several stations, said arm being arrested in its movement and making contact with the station corresponding to the one indicated by the stop at the calling-station.

Another feature of my invention resides in the construction and operation of a pedal or foot switch which is adapted to cut out the bell-circuit and cut in the primary of the talking-circuit.

Other features of invention reside in the construction, arrangement, and combination of the several parts, all as will hereinafter be described and afterward pointed out in the claims.

In the drawings, referring particularly to Fig. 5, I have shown three stations numbered 1, 2, and 3. Of course it is obvious that a greater number of stations could be connected, but for the purposes of illustration I have shown three. I will assume that the person at station No. 1 desires to call up station No. 3. A stop-plug 5 is inserted in the opening in the dial-plate 6, and a power-driven arm 7 starts to revolve and continues so to do until arrested by coming into contact with the plug 5 in the hole 3. This mechanism which causes the revolution of arm 7 also causes the rotation of a contact making and breaking device, which is shown more clearly in Fig. 2ª, in which it will be seen that a portion of the cylinder or sleeve 8 is insulated, the greater part of said sleeve being of suitable conducting material, such as brass.

9 indicates a spring-contact which bears against this contact making and breaking device, said contact 9 being insulated from the frame in which said contact making and breaking device is mounted. Connected to this contact 9 is a wire 10, leading to a battery 11, from the other side of which battery leads a wire 12 to magnets 13, arranged to control the power mechanism at the central exchange. From these magnets the current is lead back to the station whence it came by a wire 14, said wire 14 being connected to the frame in which the contact making and breaking shaft is mounted. The contact making and breaking shaft is preferably driven by suitable gears, the power being stored in a spring which is adapted to be wound by a suitable key. (See Figs. 1 and 2.) A fan-wheel 15 is arranged in the train of gears to prevent too rapid rotation being imparted to the contact making and breaking device. The magnets which are energized by this battery-circuit, which is made and broken as above described, attract an armature mounted upon

a forked lever 16, Figs. 3, 4, and 10. The forks of this lever are provided with projections 17, which coöperate with projections 18 on a power-driven disk 19. Suitable adjusting-screws 20 control the movement of this forked lever. A spring 21 is connected to said lever for withdrawing the same from the magnets, as is well understood. This mechanism resembles a clock-escapement, and upon the energization of the magnet 13, as above described, releases power stored up in a suitable spring, which power revolves a contact-making arm 22, on the end of which is a spring-contact 23, adapted to contact with terminals 24, in the form of binding-posts, to which are connected wires leading to the different stations. The mechanism which actuates the making and breaking device at the station is so arranged that contact 9 is alive and dead once, while the arm 7 travels the distance between two holes in which the plug 5 is adapted to be inserted. Whenever the arm 7 is arrested by the plug, the shaft 8 occupies such a position relative to the contact 9 that said contact is completed and so remains until the plug is removed and the arm permitted to return to zero, when said contact 9 again rests on the insulated part of sleeve 8. The mechanism at the central exchange is so geared that at each energization and deënergization of the magnets 13, which imparts a complete vibration to the forked lever 16, the arm 22 will have moved the contact 23 from one terminal to another. So, therefore, it may be said that a complete revolution of the arm 7 will cause a complete revolution of the arm 22 at the central exchange. The post 25 at the central exchange, on which the contact 23 rests when not in use, is not connected with any station, as shown. We will assume, therefore, that the plug 5 has been placed in the hole numbered 3 to call up station 3 and that said arm 7 has traveled around to said plug, where it is arrested, which has caused the travel of arm 22 around, so that its contact 23 now rests upon the terminal which is connected to station 3. The "talking-circuit," as I will call it, is established through wire 25^a, arm 22, spring-contact 23, wire 26, with whose terminal said spring-contact 23 is in engagement, and as the arm 22′, corresponding to 22, has not been actuated the circuit will be continued through wire 27, and as arm 22″ of station 3 has not been actuated and rests upon the blank terminal said circuit will be continued through wire 28 to station 3, whence it goes to ground from post 29, if a ground return is used, or if a metallic return is used the circuit is continued through wire 30 back to station 1. Station 2 would not be in the circuit because its wire 31, corresponding to wire 25^a of station 1, would not be continued beyond the posts marked 2 at the central station. When through talking, plug 5 should be removed in station 1 and the arm 7 permitted to return to zero, which will cause the arm 22 to rest on the blank terminal at the central station. If a person at station 3 desires to call up station 1, he places the plug 5 in hole marked 1 and permits the arm 7″ to travel to that point which will cause the arm 22″ to contact with the terminal marked 1 at the central station. The talking-circuit will now be established through wire 28, arm 22″, wire 33, wire 34, wire 25^a to station 1 and from post 36 to ground or by return-wire 30 to station 3.

I have shown in Fig. 9 a magneto call-box which is preferably used in connection with my invention. In calling up a station, as when calling up station 1 from station 2, the plug is put in a hole marked 2, and when sufficient time is given for the contact making and breaking device to engage with post 2 at the central station button 37 is pressed in and a crank-handle 38 turned. This will establish a ringing-circuit through wire 38, foot-switch 39, wire 40 to main-line wire 41 to station 1 and from station 1 through wire 51 to ground. When a call has been made, the hand-receiver 52 is removed from its hook 53 and the foot-switch 39 depressed to connect the spring-terminal 54 and 55, which establishes the primary circuit through the transmitter. The secondary circuit has included in it the hand-receiver, as usual.

From the above it will be seen that the foot-switch cuts out the bell-circuit and connects the primary circuit or cuts in the transmitter.

I am aware that many minor changes in the construction, arrangement, and combination of the several parts of my device can be made and substituted for those herein shown and described without in the least departing from the nature and principle of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. A telephone system comprising telephones located at outlying stations, a dial or disk, a power-driven arm operating in juxtaposition to said disk, a stop to arrest the motion of said power-driven arm at any predetermined point, a make-and-break mechanism comprising a rotary shaft geared to said arm and provided with separated insulated portions, and a contact-arm adapted to bear against said shaft in the path of said insulated portions, all said parts located at each of the outlying stations, in combination with a central-exchange station comprising an electrical device in circuit with said make-and-break mechanism, a power-driven contact-making arm for each outlying station in the telephone-circuits, terminals from all the outlying stations in the path of each of said arms, and an escapement mechanism for each power-driven contact-arm, controlled by said electrical device, substantially as described.

2. A telephone system comprising telephones located at outlying stations, a make-and-break mechanism at each of said outlying stations, in combination with a central-exchange station comprising a power-driven contact-making arm for each outlying sta-

tion in the telephone-circuit, terminals of said telephone-circuits from all the outlying stations in the path of each of said arms, a magnet for each arm, circuits independent of the telephone-circuits each including one of said make-and-break mechanism and magnets, an armature for each magnet provided with a bifurcated end, a rotary disk driven by the power used for driving the contact-making arm, stops on said bifurcated armature adapted to engage said disk, and connections between said disk and contact-making arm whereby the latter is controlled by said armature, substantially as described.

3. In a telephone, the combination with a bell-ringing circuit, the secondary circuit and the receiver-hook for closing the secondary circuit, of a foot-switch normally closing the bell-ringing circuit, and spring-contacts 54 and 55 with which said foot-switch is adapted to contact said contacts being terminals of the transmitter primary circuit, whereby, when the foot-switch is depressed, it cuts out the bell-ringing circuit and cuts in the transmitter primary circuit, substantially as described.

In testimony whereof I hereunto affix my signature, in presence of two witnesses, this 24th day of August, 1896.

WILLIAM W. DAVIS.

Witnesses:
THOMAS YEATMAN,
J. B. SUTTER.