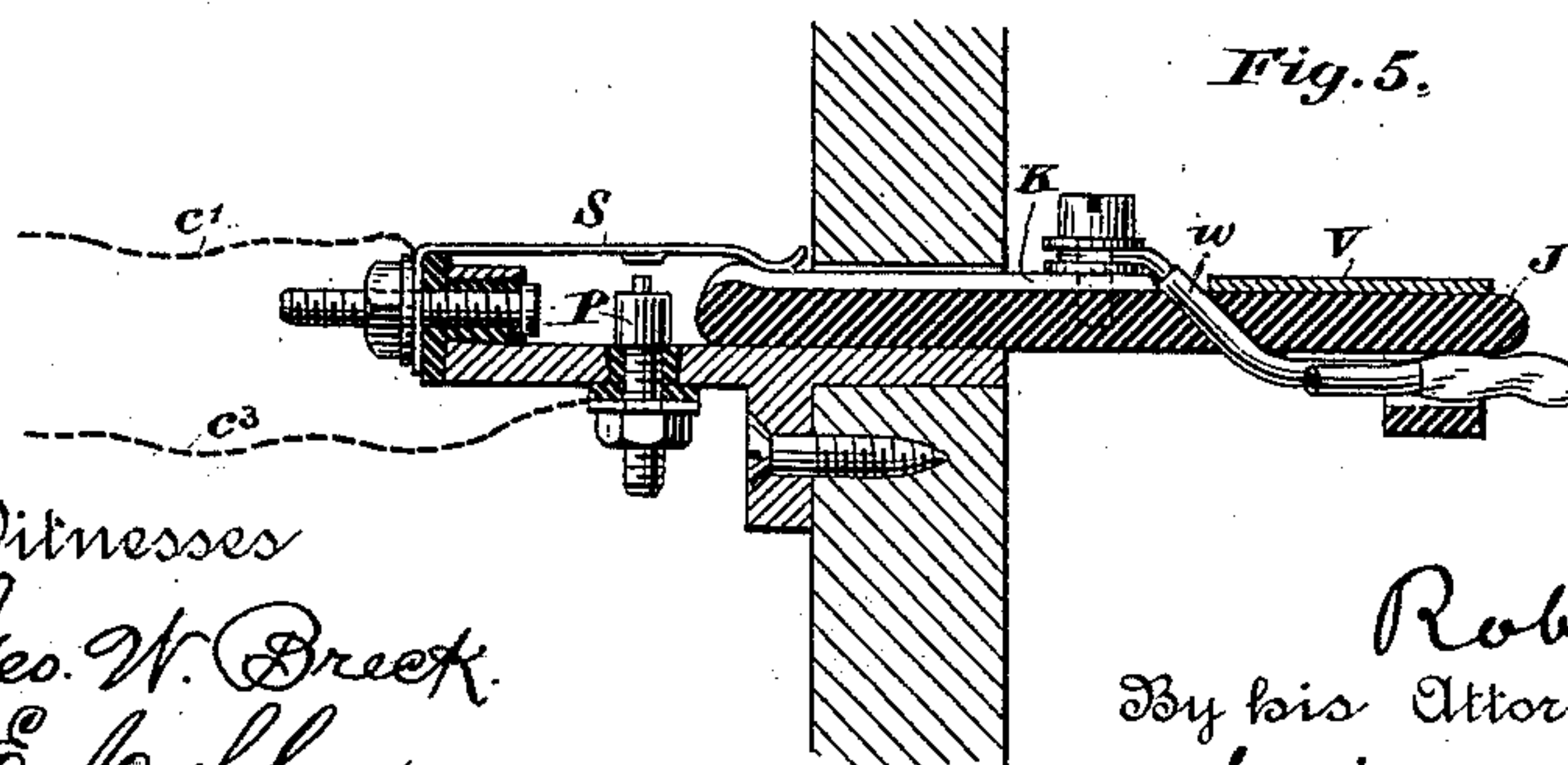
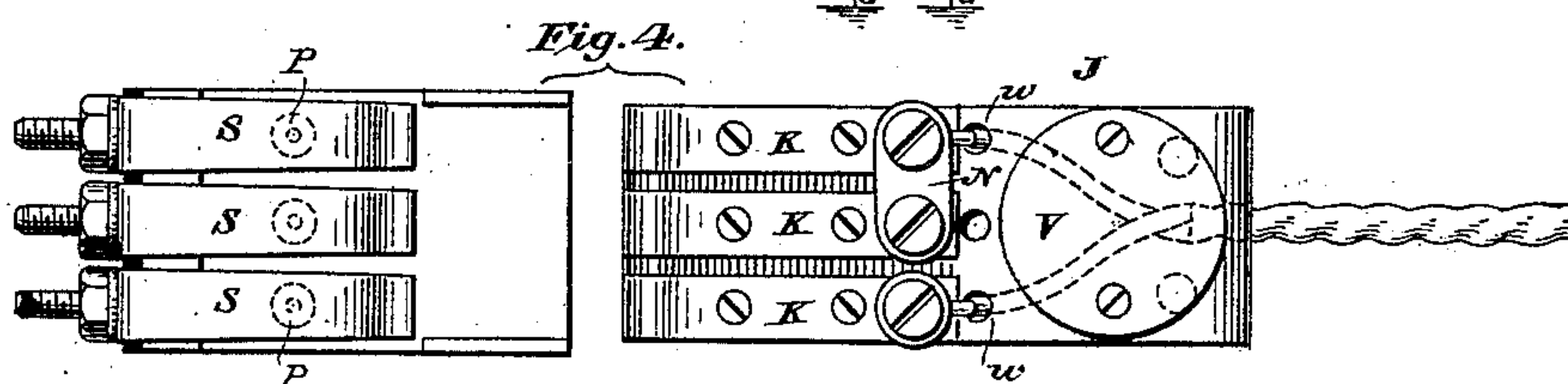
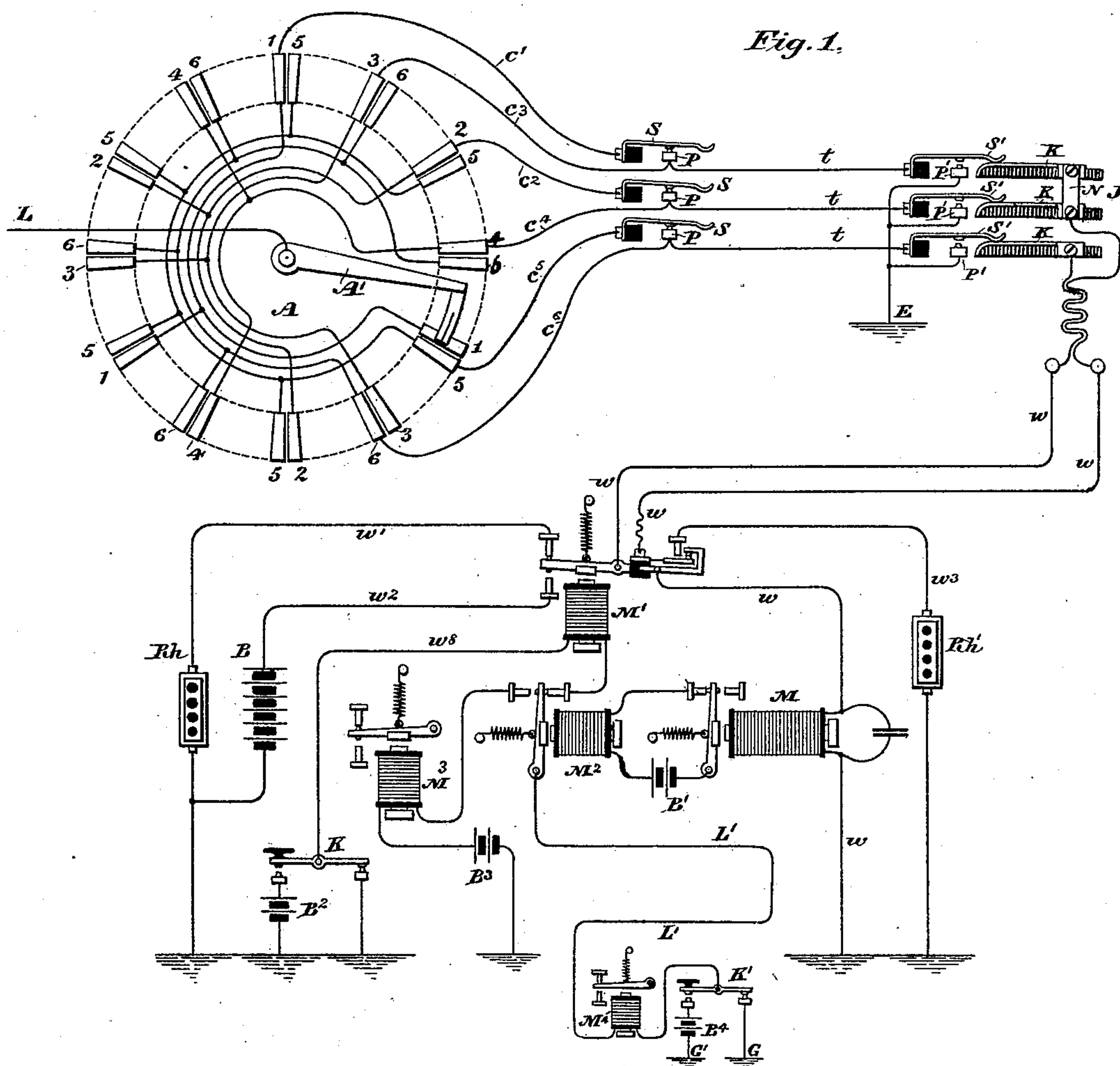


2 Sheets—Sheet 1.

# MULTIPLEX SYNCHRONOUS TELEGRAPH.

Patented Mar. 25, 1890.



Witnesses  
Geo. W. Breck.  
C. E. Ashley

Inventor  
Robert G. Brown  
By his Attorneys  
Wiedersheim & Kintner

(No Model.)

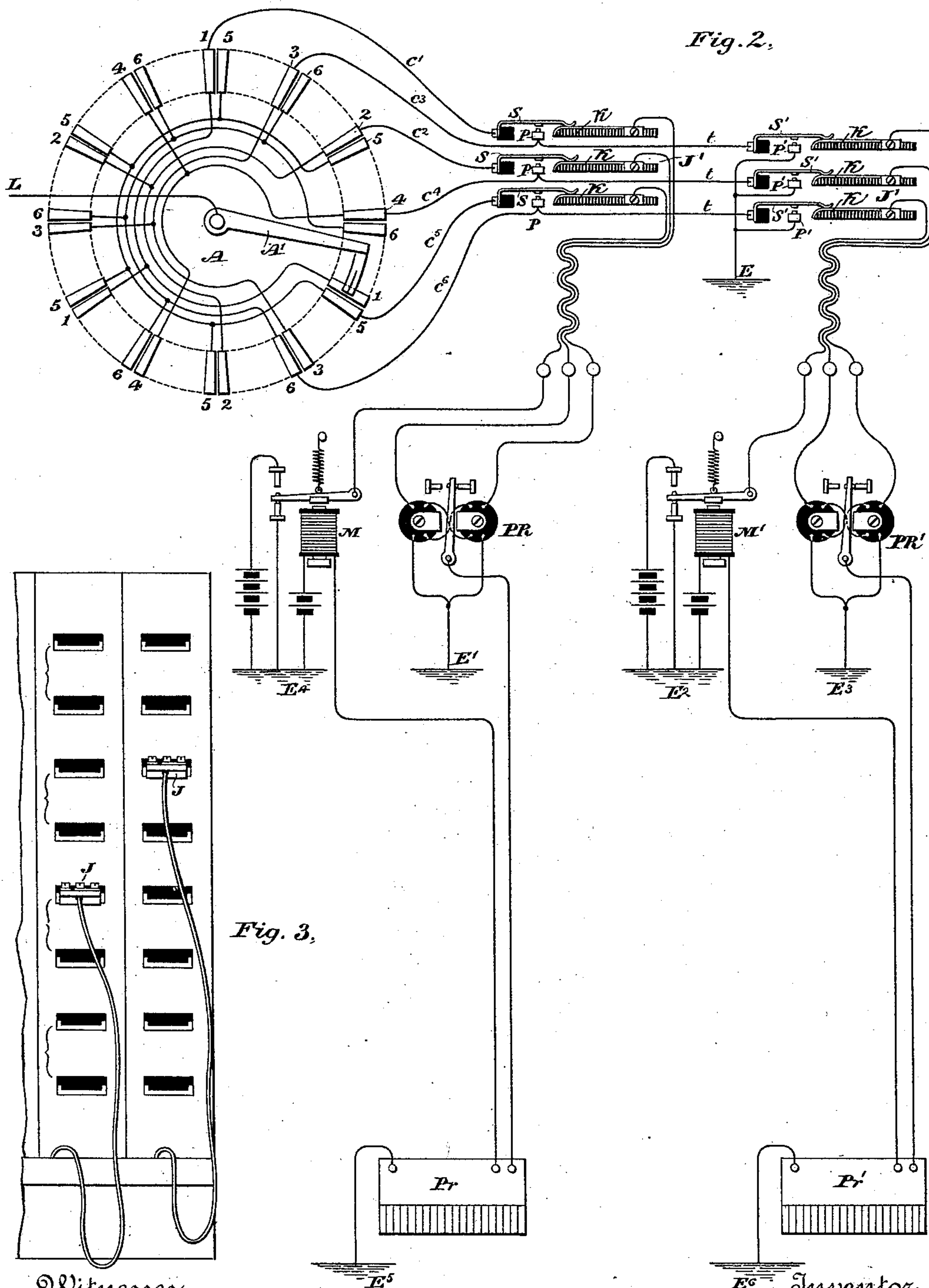
2 Sheets—Sheet 2.

R. G. BROWN.

MULTIPLEX SYNCHRONOUS TELEGRAPH.

No. 423,902.

Patented Mar. 25, 1890.



Witnesses  
Geo. W. Drexler  
C. E. Ashley

Inventor  
Robert G. Brown  
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Wiedersheim & Kintner



# UNITED STATES PATENT OFFICE.

ROBERT G. BROWN, OF BROOKLYN, NEW YORK.

## MULTIPLEX SYNCHRONOUS TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 423,902, dated March 25, 1890.

Application filed April 27, 1889. Serial No. 308,880. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT G. BROWN, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have made a new and useful invention in Telegraphy, of which the following is a specification.

My invention relates particularly to improvements in that branch of the art of telegraphy known as "synchronous multiplex telegraphs," in which several operators located at a single station are enabled to communicate or to transmit signals to a similar number of operators located at a distant station and over a single main-line wire—such, for instance, as is disclosed in my prior patents, No. 355,860, granted January 11, 1887, and No. 364,893, granted June 14, 1887; and its object is to devise switch mechanism adapted to connect the segments of such apparatus with various kinds of telegraphic instruments.

In synchronous multiplex telegraphs of the type mentioned it is preferable for the transmission of Morse signals to connect a greater number of segments to the individual sets of operators' apparatus, so that a greater number of impulses may be received successively than is the case where instruments like telegraphic printers are employed.

By referring to my patent before mentioned, No. 355,860, which relates to the operation of Morse instruments only, it will be seen that it is preferable to employ a group of twelve segments taken at equally distant points in the circle of segments and connecting them one after the other into a group and thence to the operators' apparatus, and by referring to my before-mentioned patent, No. 364,893, which relates to the operation of printing-telegraph instruments only, that it is preferable to employ six segments selected at equally distant points in the circle of segments and connected into two groups of three segments each, the three segments of one group being equally distant from the three segments of the other group. It is therefore obvious that where it becomes necessary to substitute the one class of instruments for the other complicated changes would be necessitated, which would require much time, and, while the distributors are running, no little care to accomplish the result sought.

It is the especial object of the apparatus, therefore, which constitutes the subject-matter of the present application to overcome this difficulty, and I accomplish it by the mechanism hereinafter described, but particularly pointed out in the claims which follow this specification.

My invention will be better understood by referring to the accompanying drawings, in which—

Figure 1 is a diagrammatic view of a synchronous multiplex telegraphic apparatus at one station, showing also my arrangement for connecting the segments to the transmitter and receiver of a single set of Morse apparatus in accordance with my present improvement. The other sets are not illustrated, they being mere duplicates of the one shown. Fig. 2 is a similar diagrammatic view of a similar apparatus, showing two printing telegraphic instruments connected to the same distributor by my improved mechanism. Fig. 3 is a side elevational view of a portion of the switch-board, showing switch, jacks, and plugs in position. Fig. 4 is a plan view showing my switch, jack, and plug and flexible cord-connections. Fig. 5 is a vertical sectional view showing one of the switch jacks and plugs in position.

L represents the main line connected to the trailer A' of the distributor A, the segments 1 2 3 4 5 6 of which are connected in sets or groups, as shown in accordance with the principle enunciated in my prior applications filed in United States Patent Office on the 6th day of March, 1886, bearing Serial Nos. 194,302 and 194,303 and No. 242,602, the essential feature of which is to allow for the retardation of the current over the main line by sending from one segment and receiving the impulse on the next segment. All of the segments numbered 1, 2, and 5 are connected, respectively, in groups and by conductors  $c^1$  and  $c^2$  and  $c^5$  to springs S, resting normally on contacts P, while all of those segments numbered 3, 4, and 6 are connected similarly and by wires  $c^3$ ,  $c^4$ , and  $c^6$  to contact-points P, and conductors  $t$   $t$ , running, respectively, to a second set of springs S', which bear normally on contacts P', connected by a common wire to earth at E, when there is no operator's instrument in circuit.



J represents a jack-plug composed of three insulated contact-plates K K K, carried by an insulating-block, and adapted to contact with either of the sets of springs S or S' when in position, as clearly shown in Figs. 1, 2, and 5 for Morse apparatus. Two of the plates K K, Fig. 1, are electrically connected by a metallic link N and to one of a pair of flexible conductors *w*, the other flexible conductor being connected to the remaining plate K.

M, Fig. 1, represents the main-line relay, and M' the transmitter-magnet, while M<sup>2</sup> represents a local repeating-relay adapted to repeat messages into the local outlying line L', and to receiver M<sup>4</sup>, connected to the earth at a distant local station, as shown. This apparatus, together with the printing-relays P R and P R' and printing apparatus Pr and Pr', shown in Fig. 2, is fully disclosed in my prior applications and patents referred to, and need no further description here, being simply shown to illustrate the application of my present invention to connect the segments in circuit for use either with the Morse or printer system, as desired.

When the apparatus is connected as shown in Fig. 1, a single plug being in circuit with the right-hand set of contact-springs S' S', the trailing arm A' will transmit twelve impulses for each complete revolution, each group of sending-segments transmitting six impulses, there being two of such groups of six segments each, and will receive twelve impulses for each complete revolution, each group of receiving-segments receiving three impulses, there being four of such groups of three segments each, the connections being such between the springs S S S and contacts P P P that all the segments are connected through to the springs S' S' S', and thence by plug and wire to the operator's apparatus. When, however, it is desired to utilize all of these segments for instruments which respond to a smaller number of impulses, like printing-telegraph instruments, which require a different combination of grouping, two plugs J' and J' are inserted, as shown in Fig. 2, thus connecting two sets of printers, each of which utilizes six sending and receiving impulses with each complete revolution of the trailer. These jack-plugs J' J' differ from the plugs J J in that the connecting-link N is removed and the parts K connected through independent circuits to the armatures of neutral relays M M' and the coils of printing-relays P R and P R'. It will be seen on examination of Fig. 2 that the groups of 1's, 2's, and 5's are connected through the plug J and polarized relay P R to the printer Pr, while the groups of 3's, 4's, and 6's are connected by the second plug J' through the second polarized relay P R' and its printer Pr', thereby permitting two printing apparatuses to take the place of one Morse apparatus, as shown in Fig. 1. These switch-jacks and other connections above described may be arranged in a manner well under-

stood upon a switch-board, as shown in Fig. 3, each strip of switch-jacks being connected to the circle of segments of a different distributor, all the arrangements being such that whenever it is desired to utilize any of the segments of any distributor not in use the connections may be made at will or those in use changed to other apparatus. With such an arrangement of switching apparatus I am enabled to interchange multiplex circuits at the pleasure of a central-station switch-operator and at any time disconnect a central-station distributor and substitute another therefor or divide the circuits of any number of distributors between one or more printers or other instruments at pleasure.

I do not limit myself to the specific mechanism herein shown for connecting up groups of segments at will in an automatic synchronous telegraphic apparatus, as I believe I am the first to embody this broad idea in such a system.

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

1. In a system of multiplex synchronous telegraphy, the combination of a series of contact-segments connected in groups to two independent sets of switch-board connections and jack-plug connections, substantially as described, for connecting either or both of said groups to receiving and transmitting apparatus, whereby said contact-segments may be utilized for different types of receiving apparatus, substantially as described.

2. In a system of multiplex synchronous telegraphy, the combination of a series of contact-segments connected in groups to independent contact-springs, and supporting contacts therefor, with jack-plug connections, substantially as described, for varying the number of impulses which may be transmitted or received by one or more independent transmitting or receiving instruments, substantially as described.

3. In a system of synchronous multiplex telegraphy, the combination of a series of contact-segments connected in independent groups to a series of contact-springs, and a corresponding series of contact-points against which said springs are adapted to bear, with one or more jack-plugs having connections, substantially as described, for varying the number of electrical impulses which may be transmitted or received by one or more sets of transmitting or receiving apparatus, substantially as described.

4. A jack-plug switch for use in multiplex synchronous telegraphs, consisting of a series of contact-springs, each electrically connected to an independent group of segments, one for each spring, and a jack-plug having a corresponding series of electrical contact-plates, one of which is connected to the transmitter-circuit and the others in multiple arc to the receiver circuit or circuits, substantially as described.



5. A jack-plug switch for use in multiplex synchronous telegraphy, having connections, substantially as described, consisting of contact plates and springs with circuit connections attached to independent groups of transmitting and receiving segments in such a system for varying the order of impulses which may be transmitted or received, substantially as described.

10 6. In a system of multiplex synchronous telegraphy, the combination of a trailing arm with two series of contacting segments, the individual segments of each series having a fixed relation with those of the other, and two  
15 sets of switch-plug apparatus connected, respectively, to independent receiving apparatus and to the respective sets of segments, the connection between the first-named apparatus and its set of segments being such that when  
20 the switch-plug apparatus is removed both sets of segments are connected through the second set of apparatus, substantially as described.

25 7. A multiplex synchronous telegraph having a trailing arm connected to a main line, in combination with groups of contacting seg-

ments interlocated at equal distances from each other, and two sets of switch-plugs connected to independent receiving apparatus and to the individual groups, the connections  
30 between one group and its switch-plug apparatus having additional connections for uniting it electrically to the other apparatus when the first-named switch-plug is withdrawn, substantially as described. 35

8. A switch-plug for use with multiplex synchronous telegraphic apparatus of the character described, consisting of a three-way contact-plug, two of its contacts being connected in multiple arc to the receiving apparatus and the other contact to the transmitter,  
40 substantially as described.

9. A switch-plug for use in a multiplex synchronous telegraph of type described, consisting of a three-way contact-plug connected  
45 to the receiving apparatus and the contact-segments, substantially as described.

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Witnesses:

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