

(No Model.)

2 Sheets—Sheet 1.

F. D. SHEPARD.
TELEPHONE SYSTEM.

No. 547,460.

Patented Oct. 8, 1895.

Fig. 4.

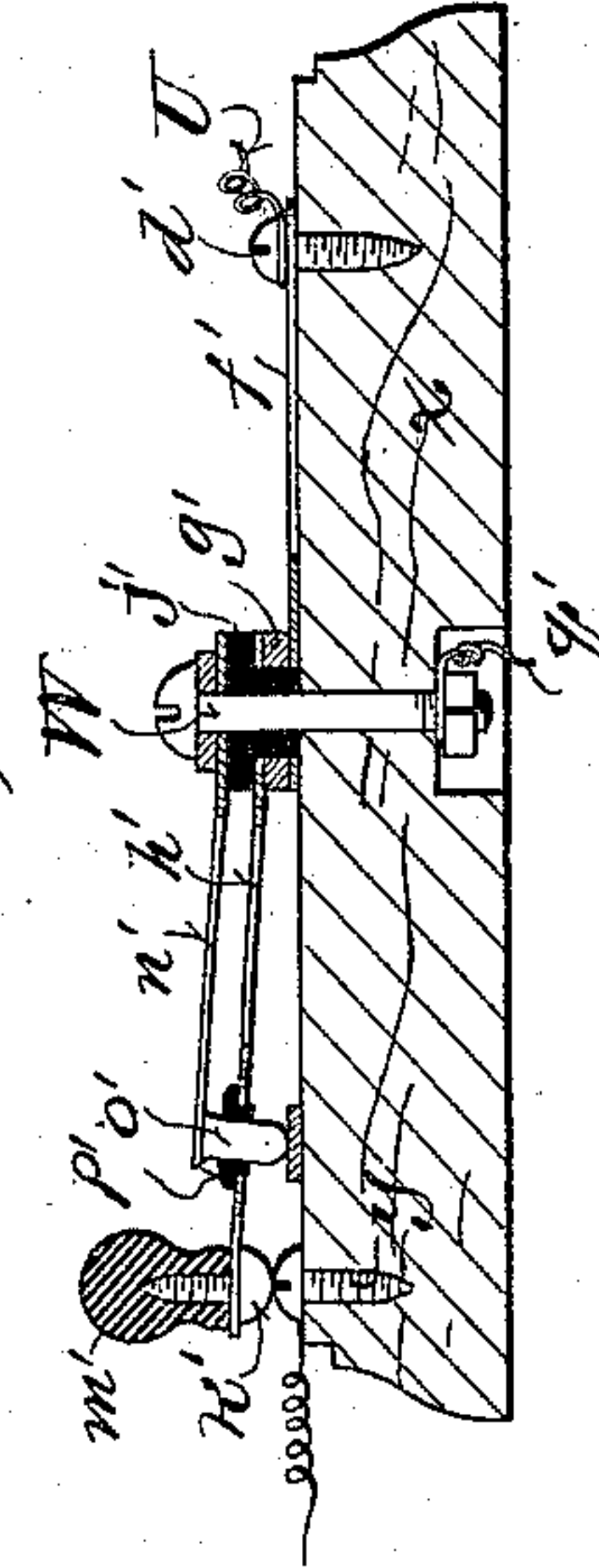
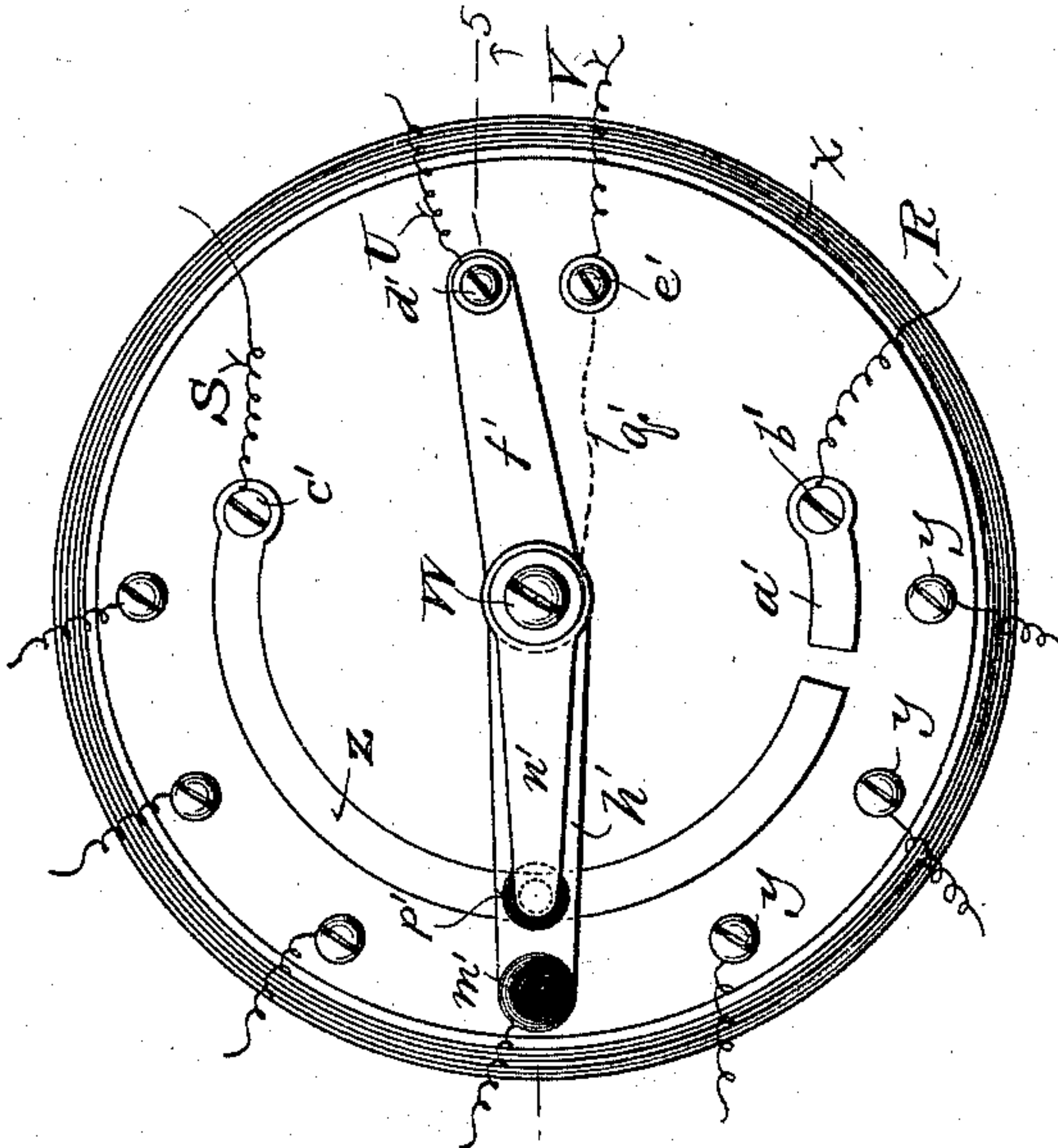


Fig. 5.

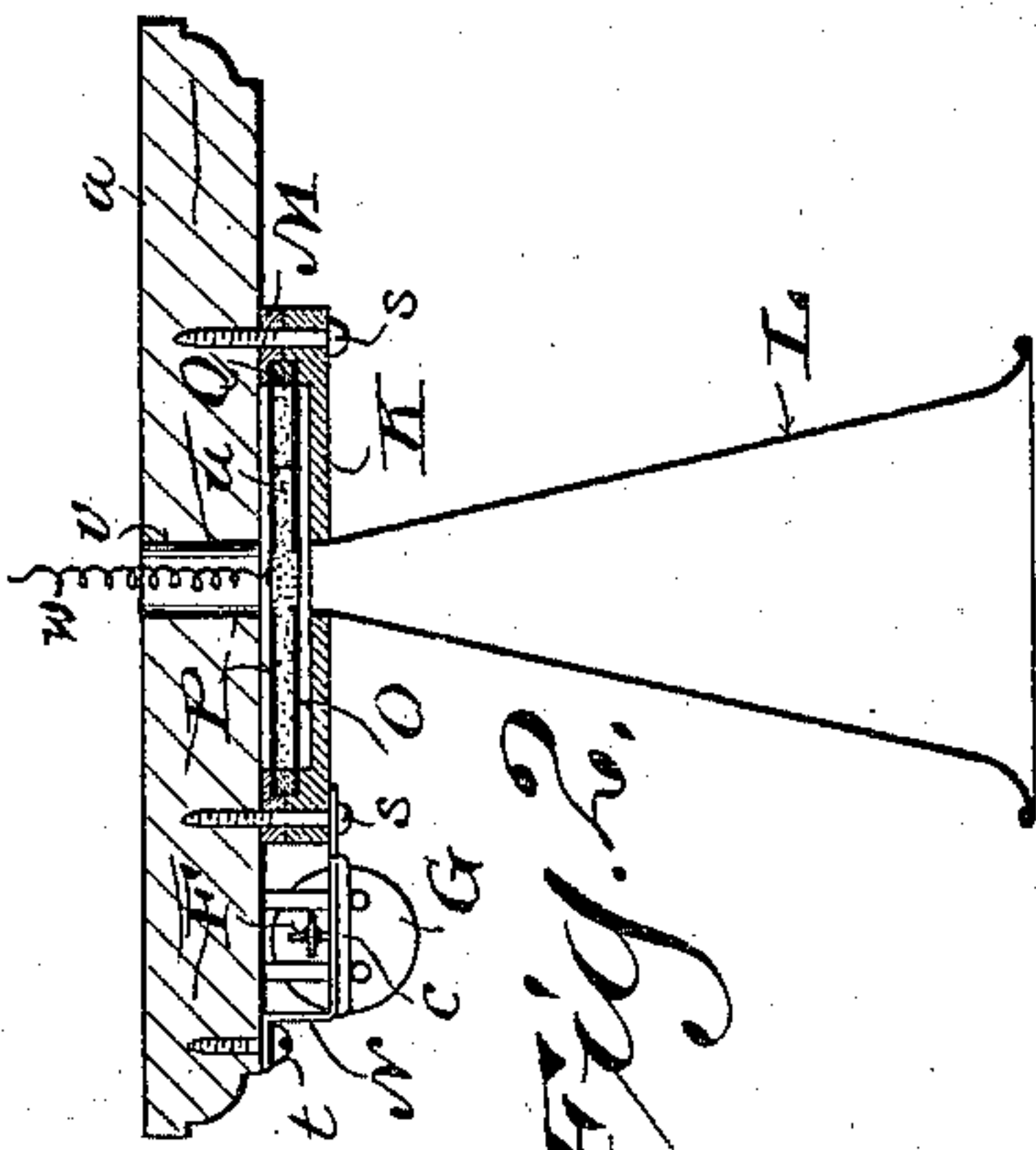


Fig. 6.

Fig. 3.

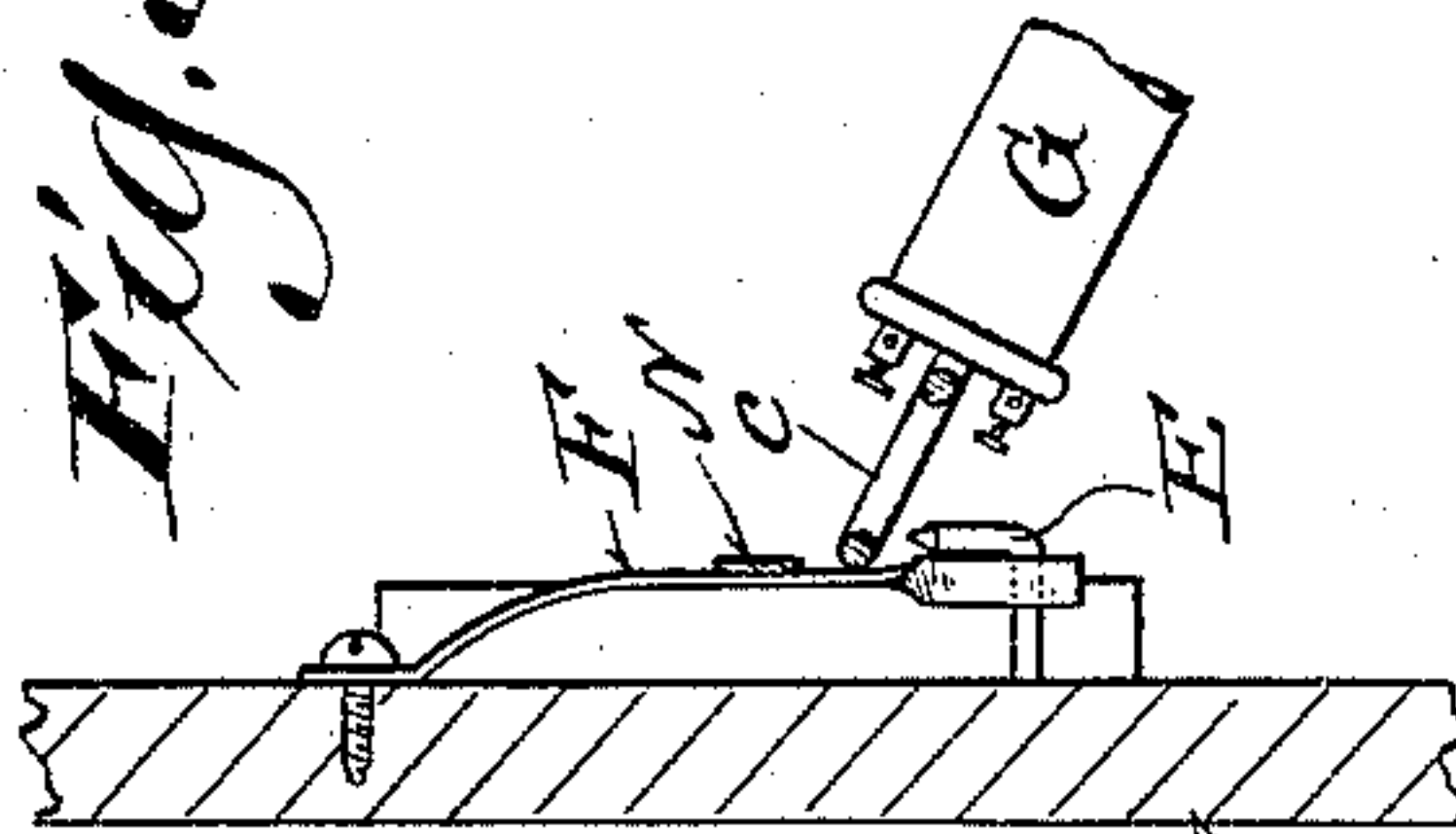
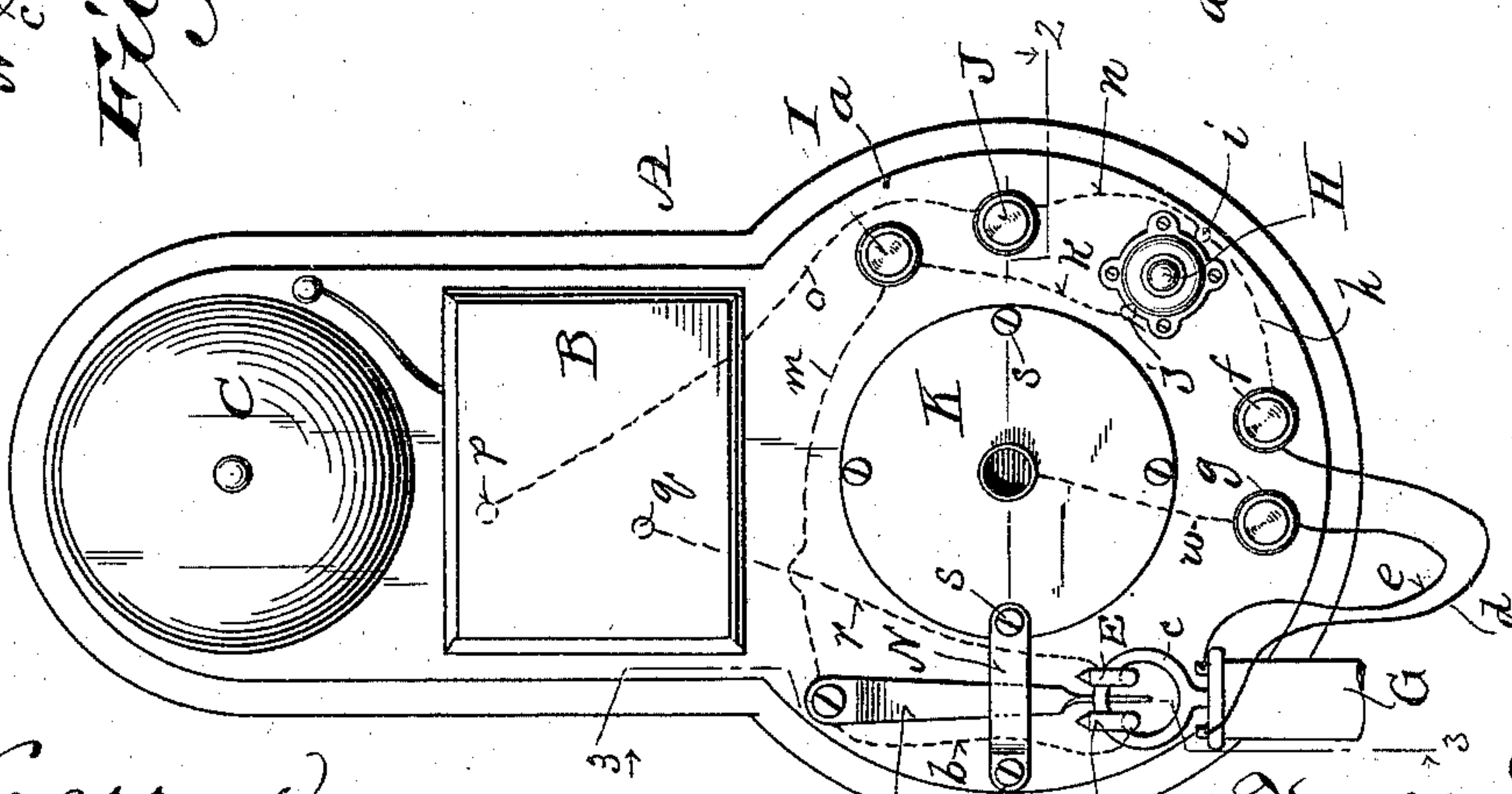


Fig. 1.



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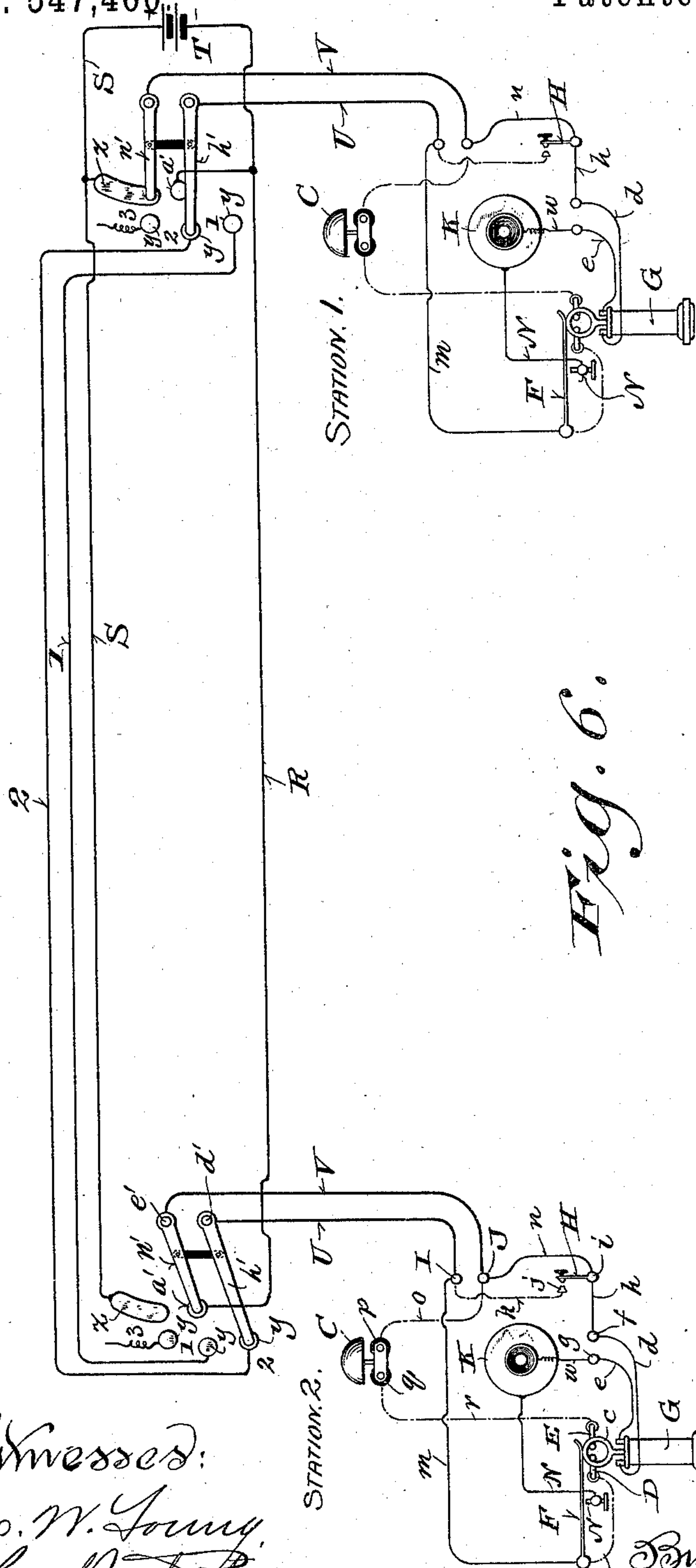


Fig. 6.

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UNITED STATES PATENT OFFICE.

FREDERIC D. SHEPARD, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO FREDERICK S. ILSLEY AND JAMES SAWYER, OF SAME PLACE.

TELEPHONE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 547,460, dated October 8, 1895.

Application filed February 18, 1895. Serial No. 538,833. (No model.)

To all whom it may concern:

Be it known that I, FREDERIC D. SHEPARD, a citizen of the United States, and a resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Telephone Systems; and I do hereby declare that the following is a full, clear, and exact description thereof.

10 My invention relates to telephone systems; and it consists in certain peculiarities in the construction and arrangements of the devices employed therein, all as will be fully set forth hereinafter and subsequently claimed.

15 In the drawings, Figure 1 is a front elevation of a telephone embodying part of my present invention with the mouthpiece of the transmitter omitted. Fig. 2 is a sectional view on the line 2 2 of Fig. 1, showing the mouthpiece of the transmitter in place. Fig. 20 3 is a detail sectional view on the line 3 3 of Fig. 1, showing the receiver detached from its supporting-hooks. Fig. 4 is a plan view of the station-switch forming a part of my invention. Fig. 5 is a sectional view on the line 25 5 5 of Fig. 4. Fig. 6 is a diagrammatic view illustrating the operation of my invention.

My present invention relates to telephones adapted for use directly between stations and 30 without the intervention of any central office or exchange, and in the diagrammatic view, Fig. 6, I have shown only two stations thus connected; but it will be understood, as further set forth hereinafter, that the number of 35 stations so connected is immaterial.

Referring to the drawings, A, Fig. 1, represents in front elevation one of my improved telephones, the dotted lines in said figure indicating the wires on the back thereof.

40 B is the box which incloses the magnets for operating the bell C.

D E represent two hooks projecting from the face of my telephone back board *a*.

45 F is a contact-spring mounted on the face of the board *a* and connected to the hook D by wire *b*.

G indicates the receiver, of ordinary construction, except the hook *c*, which is adapted, when the receiver is not in use, to hang upon 50 and thus connect both the hooks D E just named, said receiver being connected by the

usual insulated wires *d e* with the telephone binding-posts *f g*.

H is a push-button, a wire *h* connecting binding-post *f* with one part thereof, as shown 55 at *i*, while from the other part *j* thereof a wire *k* runs to binding-post I, from whence wire *m* runs to contact-spring F, while from said part *i* of the push-button wire *n* runs to binding-post J, and from thence wire *o* runs 60 to one of the contact-points *p* of the bell C, and from the other contact point *q* of said bell wire *r* runs to hook E.

K represents a brass plate forming part of the transmitter, (best shown in Fig. 2,) said 65 plate being centrally perforated for the reception of the reduced end of the tubular mouthpiece L. This plate K is provided with an annular flange on its inner side and rests against a ring M, of hard rubber or other 70 suitable insulating material, which ring M rests against the face of the back board *a*, the ring and plate being secured thereto and to each other by means of screws *s s*, as shown, one of said screws *s* also serving to secure to 75 said plate K one end of a brass contact-strip N, whose other end is secured to the said board *a* by screw *t*, said strip extending over the described contact-spring F for contact therewith at certain times, as hereinafter explained. Both the ring M and the annular 80 flange on the plate K are shouldered along their inner peripheries to receive the plates O P, which are formed of very thin sheet-iron, coated on their opposing inner surfaces 85 with insulating material, except at their centers, where this is removed for a space equal to the area of the central opening in the brass plate K for the purpose of confining 90 the passage of the current therethrough to this point. These plates O P are kept apart at their peripheries by the insulating-ring Q, and the space between said plates and said ring is filled with finely-powdered carbon, as indicated by *u*. Just in line with the centers 95 of all these plates the board *a* is provided with an opening *v* to receive a wire *w*, one end of which is soldered to the plate P at this point, and the other end of which runs to the binding-post *g*. 100

I will next describe the station-switch illustrated in detail in Figs. 4 and 5. As this

switch is adapted for use solely with my just-described telephone, it may, of course, be mounted upon the same back board *a*; but that is immaterial, and I have therefore shown
 5 a separate back board *x*, provided with a series of binding-screws *y y*, from which extend line-wires running to the different stations, as hereinafter explained. On the face of the
 10 back board *x* is secured a contact-plate *z*, arranged in the arc of a circle, and beyond one end thereof is secured a separate short contact-plate *a'*, and from a screw *b'* at the end of said short plate a wire *R* runs to one pole of a battery *T*, while from a screw *c'* at the
 15 farther end of the plate *z* a wire *S* runs to the opposite pole of said battery. From binding-screw *d'* on said board *x* a wire *U* runs to binding-post *I* on the telephone back board, and from binding-screw *e'* on the board *x* a
 20 wire *V* runs to binding-post *J* on the telephone back board. A metallic plate *f'* extends from the screw *d'* to the center of the board *x*, and at said center this plate is formed with a perforation, through which passes a pivot-bolt
 25 *W*. Resting on this end of said plate *f'* is a metallic collar *g'*, and on this collar rests the perforated end of a metallic switch-arm *h'*, the metallic parts *f'*, *g'*, and *h'* being all in contact with each other, but insulated from the pivot-bolt *W*, as shown at *j'*. The outer
 30 end of the switch-arm *h'* is provided with a contact-screw *k'* for engagement with one or the other of the described binding-screws *y*, and is further provided with an operating-handle *m*, of suitable insulating material. A
 35 second metallic switch-arm *n'* is perforated at its inner end and rests on the insulating material *j'*; but this arm must be in contact with the pivot-bolt *W*, which it surrounds, as shown, while the outer end of this arm *n'* is provided
 40 with a downwardly-projecting contact-lug *o'*, that passes through a perforation in the other switch-arm *h'*, from which it is insulated, as shown at *p'*, said lug being in contact with the plate *z* or plate *a'*. From the under side
 45 of the pivot-bolt *W* a wire *q'* extends to the binding-screw *e'*.

To explain the operation of my invention I will refer to the diagrammatic view, Fig. 6,
 50 wherein at the right I have indicated "station 1" and at the left "station 2," but have not deemed it necessary to fully letter the parts in both stations, as they are identical in construction. The normal position of all the
 55 station-switches is shown at the left of Fig. 6, which shows (in station 2) the switch-arm *h'*, resting on the binding-screw *y*, which connects with the wire of that station, (wire 2 in this instance,) while the switch-arm *n'* will
 60 normally rest on the plate *a'*.

Let it be understood that station 1 wishes to call station 2. The operator in station 1 first removes his receiver *G*, thereby breaking the bell-circuit shown in the drawings
 65 and permitting the contact-spring *F* to rest upon contact *N*, thus forming a local talking-circuit in station 1. He next moves the sta-

tion-switch (from its normal position described) so that switch-arm *h'* will rest on the
 binding-screw *y*, which connects with wire 2, 70
 and this carries switch-arm *n'* into contact with plate *z*, as shown at the right-hand end of Fig. 6, wherein I have illustrated this calling
 position of the station-switch instead of the 75
 described normal position. He next presses push-button *H*, thereby short-circuiting his receiver and transmitter and ringing bell *C*
 at station 2. The operator at station 2 removes his receiver *G*, thereby completing his local talking-circuit, and the current would 80
 then pass from the positive pole of the battery *T* through wire *S* to plate *z* of station 1, switch-arm *n'* and wire *V*, *n*, *h*, and *d* and
 their connections to receiver *G* of station 1, (said receiver being detached now from its 85
 hooks) and out through wires *e* and *w* to and through the transmitter and contact device *N* of station 1, contact-spring *F*, (now in contact with *N*,) wire *m* to wire *U* and switch-
 arm *h'* of station 1 to wire 2, and thence to 90
 switch-arm *h'* of station 2 and wires *U* and *m*, contact-spring *F*, contact device *N* to and through the transmitter of station 2, wires *w*
 and *e* to the receiver of station 2, (now detached, as stated,) wires *d*, *h*, *n*, and *V* to 95
 switch-arm *n'* of station 2, and from thence through wire *R* to negative pole of the battery *T*. In the foregoing I have not deemed
 it necessary to specify all the binding posts and screws and other minor parts; but the 100
 circuits as named can be readily traced in the diagram view, Fig. 6.

As hereinbefore stated, the number of stations connected in my system is immaterial, although in Fig. 6 I only show two stations to
 105 avoid confusion, and it will be understood that only one battery is required for the entire system, and that the wires *R* and *S* run from the contact-plates *a'* and *z* of every station-switch to said battery, while each station-switch has a wire running from the binding-
 110 screw *y*, on which its switch-arm *h'* normally rests, to a binding-screw *y* on every other station-switch in the system.

One advantage of my present system lies 115
 in the fact that if the switch-arms of any station-switch are not restored to their described normal position after use then the moment the receivers are replaced the bells *C* will begin ringing and so continue until the switch-
 120 arms are restored to said normal position, thereby giving warning of the necessity of so restoring the switch, in order that it may be in condition for the operator at that station to receive messages from the other stations. 125
 This is exactly what would happen if the parts were all left in the relative positions shown in Fig. 6, and the bells *C* of both stations 1 and 2 would continue to ring until the operator in station 1 moved his switch-arms
 130 to the same relative position as that shown in station 2—that is, with his switch-arm *h'* resting on the binding-screw *y*, which is connected to wire 1, and with his switch-arm *n'*

resting on contact-plate *a'*. This would be the normal position for the station-switch of station 1, the normal position for the station-switch of station 2 being, as stated, that illustrated in the drawings at the left of Fig. 6.

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

1. In a telephone system, the combination with a single battery, of a plurality of stations, each station comprising a transmitting and receiving telephone, and a station switch, all electrically connected together, each station switch being provided with two contact plates, and a series of binding screws corresponding in number to the number of stations, and a movable double switch-arm, the contact points of which are insulated from each other, one point being normally in contact with one of said plates, and the other point normally in contact with one of said binding screws, with wires running from each contact plate of each station switch to the opposite poles of said battery, and with a wire running from the binding-screw of each station switch on which its said switch arm normally rests to a binding-screw on every other station switch in said system, substantially as set forth.

2. In a telephone system, the combination

with a suitable back-board, of an electric bell mounted thereon, a transmitter comprising a metallic plate insulated from said board by a ring of suitable material and having a central opening and mouth-piece, a pair of thin iron plates covered with insulating material except at their centers supported between said metallic plate and insulating ring, and themselves insulated from each other at their peripheries, with the space between filled with finely powdered carbon, a pair of hooks projecting from said board, a contact spring projecting between said hooks, a contact strip arranged over said contact spring and connected to the outer metallic plate of the transmitter, a push-button, a receiver connected to binding posts on said board, and having a metallic ring for engagement with said pair of hooks, and electrical connections between all of said parts, substantially as and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand, at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

FREDERIC D. SHEPARD.

Witnesses:

H. G. UNDERWOOD,
HENRY DANKERT.