W. W. DEAN.

DESK STAND.

APPLICATION FILED JAN. 6, 1904.

915,077.

Patented Mar. 16, 1909.

2 SHEETS—SHEET 1.

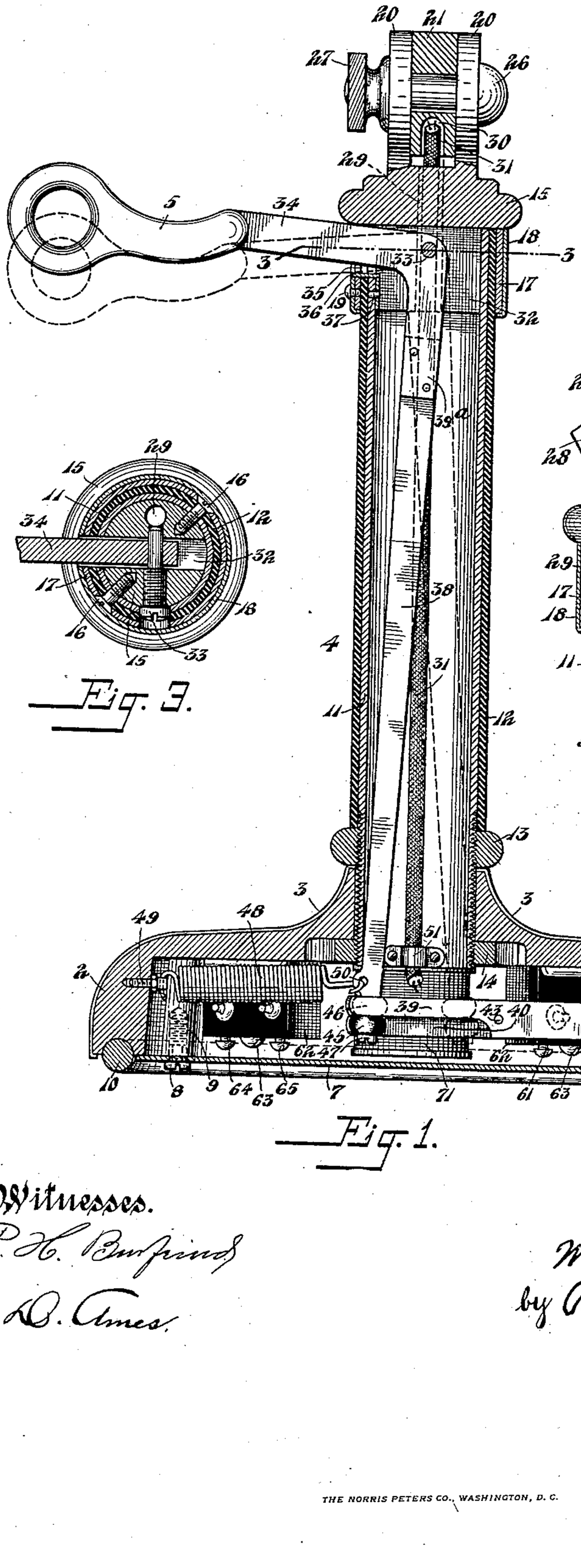

Fig. 1.

Fig. 3.

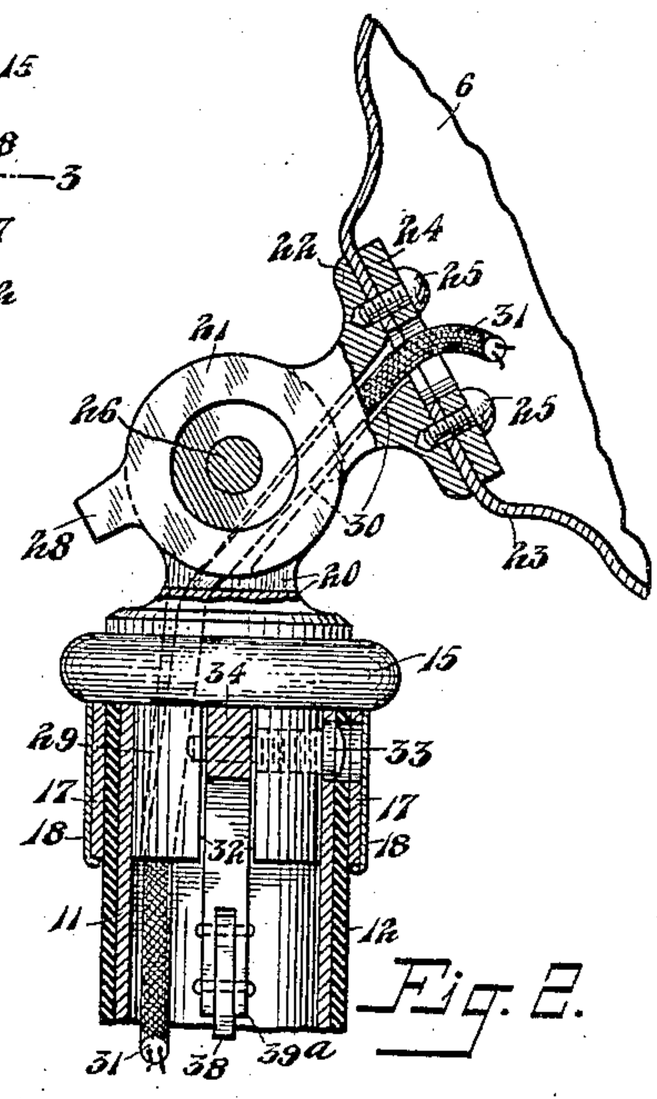

Fig. 2.

Witnesses.

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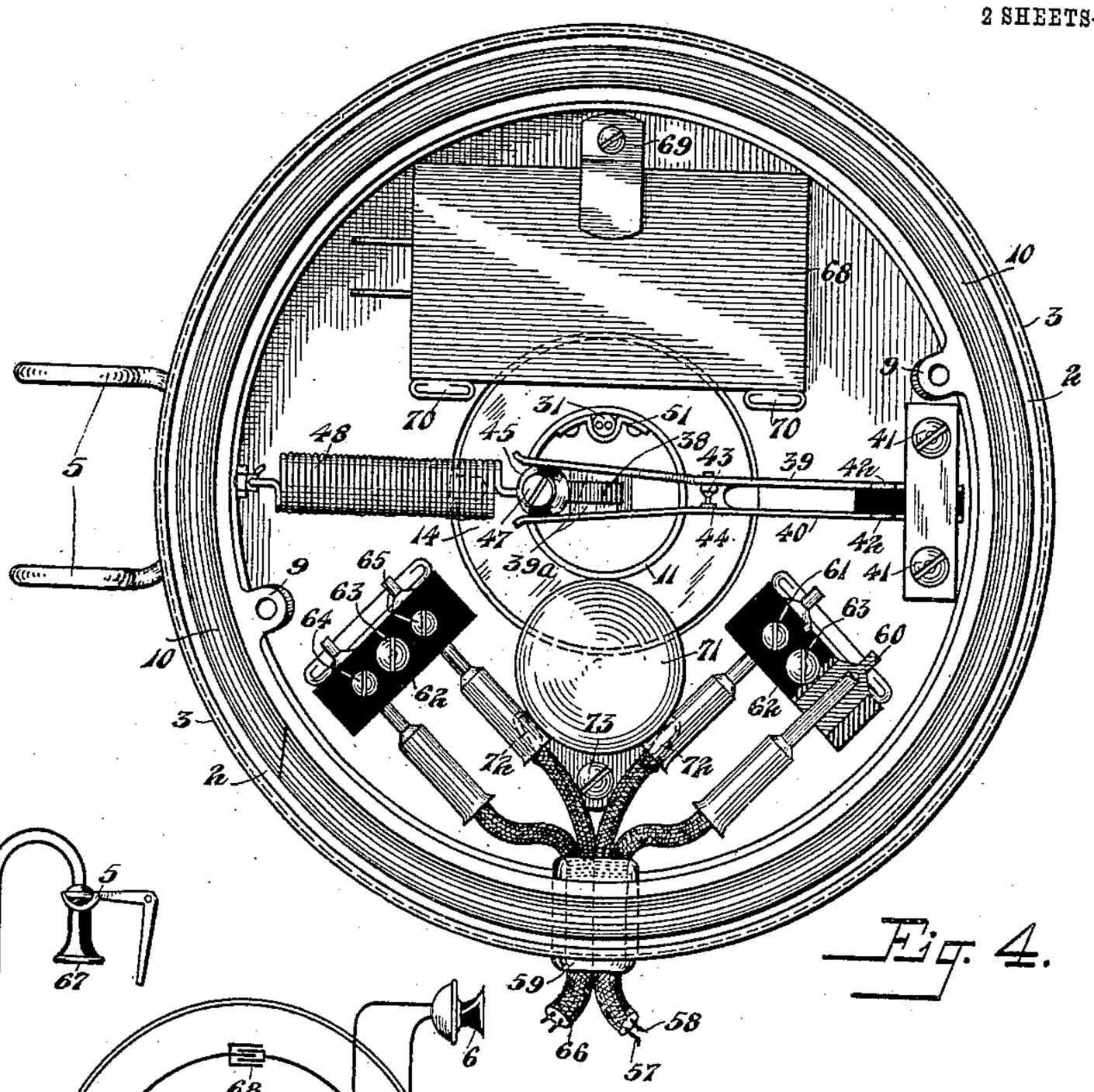


Fig. 4.

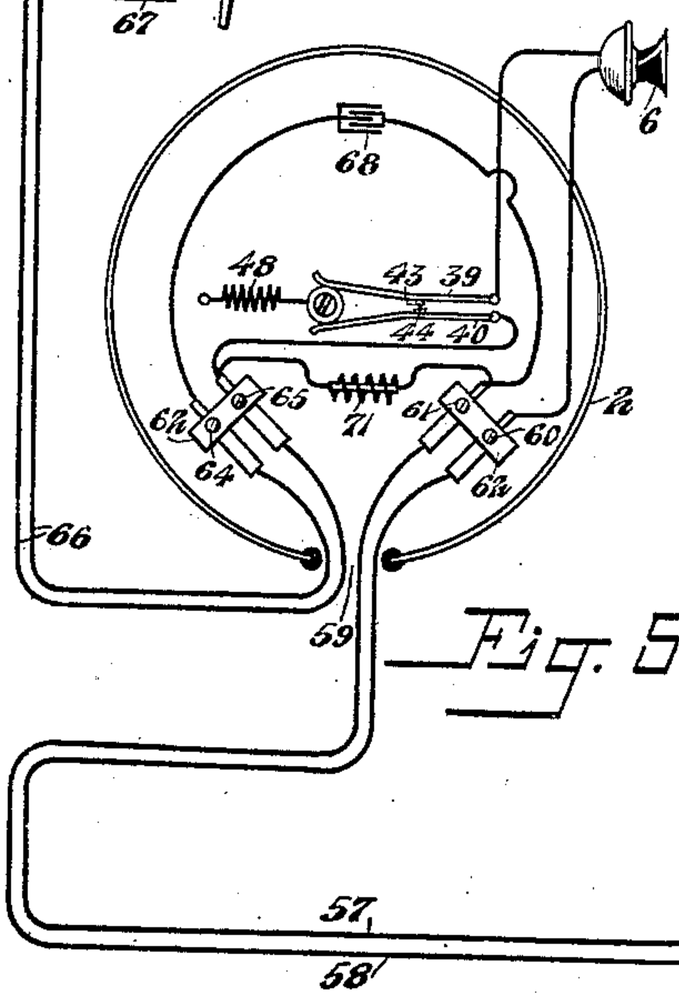


Fig. 5.

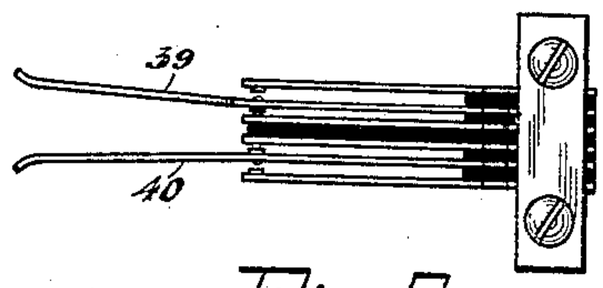
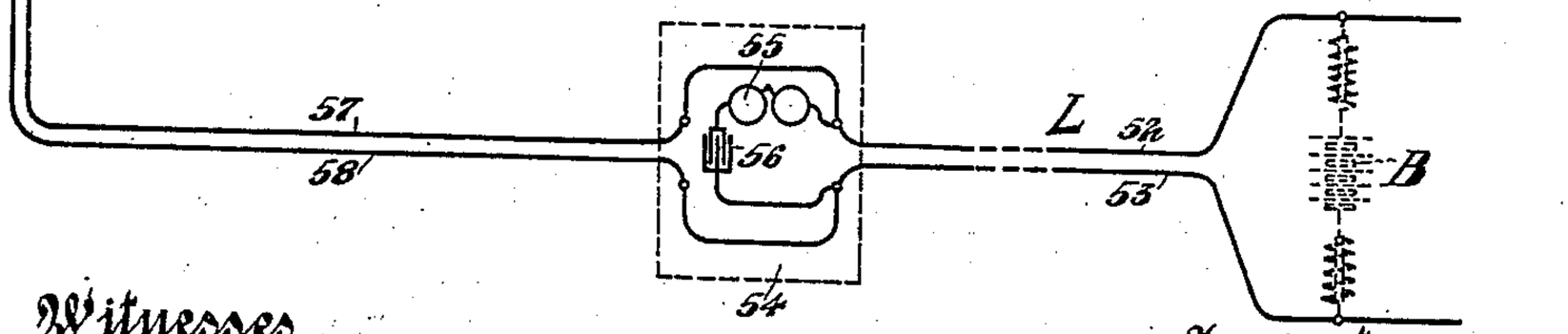


Fig. 6.



Witnesses.

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UNITED STATES PATENT OFFICE.

WILLIAM W. DEAN, OF CHICAGO, ILLINOIS, ASSIGNOR TO KELLOGG SWITCHBOARD AND SUPPLY COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

DESK-STAND.

No. 915,077. Specification of Letters Patent. Patented March 16, 1909.

Application filed January 6, 1904. Serial No. 187,909.

To all whom it may concern:

Be it known that I, WILLIAM W. DEAN, a citizen of the United States of America, and resident of Chicago, county of Cook, and State of Illinois, have invented a new and useful Improvement in Desk-Stands, of which the following is a specification.

My invention relates to improvements in subscribers' telephones of the portable type, and which are usually designated as desk sets, the portable part of the set being termed the desk stand. Such telephone sets usually comprise, in addition to the desk stand which is capable of being moved about at will and placed anywhere, a suitable bell box to which the subscriber's call bell is secured and in which the condenser if any be employed in the subscriber's circuit, and which is ordinarily of considerable size, is placed. Such condensers are usually employed for both signaling and talking, that is, under normal conditions it is included in circuit with the bell only and serves under such conditions to prevent the undesired flow of current from the common battery connected with the line at the central office, while when the telephone is used for conversation the circuit is so changed by the switch-hook of the stand when the subscriber takes up his receiver that the said condenser is suitably included in the talking circuit and is perhaps cut out of the ringing circuit. Since the desk stand must be connected with the bell box by a flexible cord and since the use of the condenser for both purposes ordinarily requires extra conductors between the bell box and the stand, the flexible cord may consist of four or five conductors which for appearance sake are usually braided and thus the cord becomes bulky and unwieldy and is inclined to twist up into knots and to tangle at every turn.

One object of the present invention is to provide a desk set and circuit therefor by which the flexible cord extending between the stand and the bell box may be reduced to two conductors only, whereby the foregoing objections to the more bulky cord are avoided and a better and more satisfactory cord is secured.

A further object of this invention is to provide a desk set for common battery work particularly, in which the number of contacts required in the stand may be reduced to one pair.

Still other objects are to reduce the number of working parts of the stand, to make the contacts readily accessible and open to inspection, to locate the various parts required in the talking circuit of the set in the base of the stand, and in general to provide a set of the character described that is simple, efficient, durable and of low cost.

To the accomplishment of these objects and such others as may hereinafter appear, my invention consists in the parts and combinations of parts hereinafter described and particularly pointed out in the appended claims, reference being had to the accompanying drawing forming a part hereof, in which the same reference characters are used throughout to designate like parts, and in which—

Figure 1 is a sectional elevation of the desk stand embodying my improvements; Fig. 2 is a detail sectional view of the upper end of the stand, the plane of the section being at right angles to that of Fig. 1; Fig. 3 is a cross section upon the line 3, 3 of Fig. 1; Fig. 4 is a bottom plan view of the stand, with the bottom cover removed; Fig. 5 is a diagram of the circuits in which the instruments may be used, and Fig. 6 is a modification of the set of springs of the other figures.

Referring particularly to Figs. 1 to 5, the stand comprises a base 2, preferably of cast iron or other suitable material, which may be provided with a covering 3 of thin sheet metal, spun thereover, upon which is mounted the standard 4, at the upper end of which standard is pivoted in any desired way the usual switch-hook 5 and transmitter 6. The base 2 is hollow and contains certain parts of the stand as hereinafter described, and is adapted to be closed preferably by a plate 7 secured to the lower edge of the said base by means of suitable screws 8 threading into lugs 9 or in any other desired manner. A ring 10 of sole leather or other suitable material is pressed and glued into a corresponding groove formed in the lower edge of the base 2 and serves to prevent the stand marring any article upon which it may be placed. The standard 4 consists of a metal tube 11 threaded at its lower end and passing through a central aperture in the upper side of the base 2. An insulating tube 12, preferably of hard rubber, is slipped over the metal tube 11 and a nut 13 is threaded upon the lower end of said tube 11 beneath the

insulating tube 12. A locknut 14 is also threaded upon the lower end of said tube 11 inside of the base 2 and serves to lock the standard and base together. A metal block 15 of ornamental outline, and usually called the head, is shouldered at its lower end to enable it to fit within the upper end of the metal tube 11 and is secured therein by suitable screws 16, (Fig. 3), or in any other desired manner. A metallic band 17 is placed around the upper end of the tube 12 and is held in place by the said screws 16. A sheet metal covering 18 is placed over the band 17 and is secured in place by the screw 19. This covering may be nickeled outside to present a neat appearance and serves to hide screws 16. A pair of lugs or ears 20 are carried by the head 15, and form the female portions of the hinge or pivot by which the transmitter 6 is connected with the desk stand. The male portion 21 of the hinge is adapted to suitably fit between the portions 20 and is preferably provided at its forward end with a flattened portion 22 to which the solid back 23 of the transmitter 6 may be secured in any desired manner, as by the washer 24 and the screws 25. A bolt 26 extends through said lugs 20 and 21 and a thumb nut 27 is threaded thereupon to secure the same in place. A stop 28 is carried by the rear end of the part 21 and is adapted to engage the block 15 when the transmitter is raised to limit the movement of the same. An aperture 29 is formed through the block 15 from a point between the lugs 20 to its lower end and terminating within the tube 11. A coöperating passage 30 is formed through the lug 21 and extends from the central point of its outer flattened end 22 which opens inside the solid back of the transmitter as shown in Fig. 2, to a point at its lower end which may be enlarged and terminates adjacent the upper end of the passage 29 formed in the block 15. With the passages so formed, the transmitter conductor 31, which is connected at its upper end inside of the casing 23 with one electrode of the transmitter, passes through the said passage 30 and thence through the passage 29 into the tube 11 and is connected at its lower end as hereinafter specified. The other side of the transmitter circuit may be completed through the walls of the instrument itself.

The hook switch lever consists of an elbow-lever pivoted within a slot 32 formed in the lower end of head 15 upon a suitable pivot screw 33, and having an arm 34 projecting from the stand through a suitable notch 35 formed in the upper ends of tubes 11 and 12 as well as bands 17 and 18, the lower edge of said notch 35 being faced with a metallic strip 36 secured in place by the rivet 37. The hook 5 from which the receiver is adapted to be suspended is formed at the end of said arm 34. The said elbow lever is provided with a longer downwardly extending arm 38, preferably consisting for purposes of manufacture, of a separate piece from the horizontal portion of the arm but riveted rigidly thereto as shown more clearly at 39[a] in Fig. 2. This long arm is preferably of sufficient length to extend into the hollow portion of the base 2, where its lower end is adapted to suitably operate the switch contacts of the set or stand. These contacts may, so far as certain features of my invention are concerned, be of any desired type but I prefer to use contacts in the form of spring strips which are rigidly supported at one end and with their operating free ends extended into proximity with the lower end of said hook lever. This is of special advantage, since the springs may themselves be directly provided with long and slightly inclined operating portions that are adapted to be engaged by the lower end of the hook lever for a wide amplitude of movement and thus are easily operated. The leverage lost by the length of the arm 38 of the hook switch is thus regained by the long but slight incline upon the coöperating ends of the switch springs. These springs may be provided in any number and arranged in any way to accomplish the desired circuit changes in the use of the instrument, but for the circuit shown in Fig. 5, I provide only two springs, namely springs 39 and 40, which are secured at their rear ends to the inner face of the base 2, said springs being separated by insulation and tightly clamped in place by the screws 41. Downwardly extending terminals 42 are provided upon the said springs to enable the circuit conductors to be readily soldered thereto. A contact 43 carried by the spring 39 is adapted to engage a similar platinum contact 44 upon the opposite spring 40, when said springs are unrestrained. As shown more clearly in Fig. 4, these springs have their free ends bent outwardly at a slight incline or are slightly flaring, and the lower coöperating end of the hook lever is adapted to travel with a wedge like action for some distance between and longitudinally of said free ends as indicated in full and in dotted lines in Fig. 1. The opposite edges of said springs 39 and 40, as is indicated in Fig. 1, are cut away to thus present offset ends or rubbing surfaces, and friction rollers 45 and 46 are mounted upon the lower end of said arm 38 opposite the respective offset ends of said springs 39 and 40 and in position to be engaged respectively thereby when the lever vibrates. These rollers are secured in place by a suitable screw 47 and in their movement are engaged upon one side only by the corresponding spring, whereby there is practically no friction between the lever and springs. A coil spring 48 secured at one end as at 49 to the inside of the base 2 and at its opposite end

as at 50 to the lower end of the arm 38 serves to positively return the said arm to the position shown in full lines in Fig. 1 when the receiver is lifted from the hook. The weight of the receiver is such as to overcome said spring 48 as well as springs 39 and 40 when it is hung upon hook 5 and moves the elbow lever to the position shown in dotted lines in Fig. 1. A suitable clip 51 secured to the inside of the tube 11 serves to retain the lower end of the transmitter cord 31 in one position in the tube 11.

In the modification shown in Fig. 6, a different set of springs is provided, one having inner and outer contacts for each spring, but in this instance also the forward ends of said springs are bent outwardly at a slight angle and preferably have offset ends so that the same operation takes place as in the case of the springs of the other figures. Other circuit arrangements may be made and other means for regaining the power lost by the inverse ratio of the lever arms may be provided.

Fig. 5 indicates the circuit connections, the battery B being at the central office and suitably connected with the line. L indicates the subscriber's telephone line extending in two limbs 52 and 53 from the substation to the central office. At the substation the desk set comprises the bell box 54 upon which the usual call bell 55 is mounted and in which there is placed the usual two micro-farad or other suitable condenser 56, the said bell and condenser being in a preferably permanent bridge of the line in case the ringing currents are sent out from the central office over the metallic line. This condenser should readily pass the slow alternating or pulsating ringing currents, but the retardation of the bell should prevent the passage of rapidly fluctuating voice currents. From the binding posts of said box the desk stand cord consisting of only two conductors 57 and 58, extends to the desk stand and passes through the aperture 59 in the base 2 and the conductors are thence connected with the binding posts 60 and 61 of said stand and which are suitably mounted in an insulating block 62 secured to the inside of said base as by screw 63. A similar set of posts 64 and 65 are secured within the base on the other side of the hole 59, the receiver cord 66 of two conductors being connected with these posts. The receiver 67 is adapted to be suspended from the hook 5. A condenser 68, preferably of one micro-farad capacity which is sufficient for talking purposes and is of small size, is secured within the base by the clamping clips 69 and the lugs 70. A retardation coil 71 is also secured within the base by the spacing lugs 72 and the screw 73 extending through a prolongation of one of the ends of the spool of the coil and threading into the base 2. The conductors connecting these parts are not shown in Figs. 1 to 4 since they would tend to confuse the drawings, but the connections are indicated in Fig. 5 and any one skilled in the art would have no difficulty in properly connecting the various parts together. As shown in Fig. 5, the particular circuits intended to be employed consist in arranging the transmitter and the switch contacts in the main line circuit in series with a pair of parallel branches, one of said branches including the retardation coil 71 and the other the condenser 68 and receiver 67. Thus when the receiver is upon the hook the main line circuit is open but when the receiver is taken up the main circuit is closed and both voice and steady currents may circulate therein. By thus placing the condenser in the base of the instrument as well as the retardation coil, instead of locating them in the bell box as is the more common method, the cord between the stand and the box may be reduced to two conductors and only a single contact is required for the switch. The single integral hook lever avoids a plurality of working parts between the lever and switch springs; placing the contacts in the base avoids locating them in or around the standard, a place difficult of access both in manufacturing and in inspecting and repairing; and securing them edgewise to the bottom of the stand makes their contacts open to view when the bottom cover 7 is removed. In fact it is only necessary to remove that cover to expose all parts that ever require adjusting, repairing or replacing, so that there is no necessity for taking the stand apart for such purposes.

Although I have thus described one specific construction and arrangement, I do not wish to be so limited in all respects, for various changes and alterations may be made therein and various uses made of the separate combinations and parts, all without departing from the scope and principle of the invention.

Having thus described my invention what I claim is:

1. In a desk set, the combination with a stand having a tubular standard and a hollow base, of a hookswitch lever mechanism within said standard and suitably pivoted near its upper end upon which the receiver is adapted to be suspended, a portion of said hookswitch lever mechanism extending downward through the tubes with its lower end adapted to have a horizontal reciprocating motion, a set of switch springs inclosed by said base and disposed in a horizontal plane to render their contacts visible from beneath, the lower end of said switch-hook mechanism being adapted to actuate said springs by its horizontal movement to control the circuit therethrough, substantially as described.

2. In a desk set, the combination with a stand having a tubular standard and a hollow

base, of a plurality of horizontally-arranged switch springs within said hollow base, the horizontal position or said springs rendering their contacts readily visible from beneath, a hook switch mechanism suitably pivoted intermediate its ends, one end of said mechanism forming a support for the receiver, the other end thereof being adapted to reciprocate horizontally to engage said springs and control the circuit therein, substantially as described.

3. In a desk set, the combination with a stand having a tubular standard and a hollow base, of a hook switch lever mechanism within said standard and suitably pivoted intermediate its ends, a plurality of contact springs inclosed within said hollow base with their contact points in an exposed position adapted to make and break the circuit, a coil associated in the circuit and also inclosed within said hollow base, one end of said mechanism being adapted to vertically reciprocate and support the receiver, the other end thereof being adapted to horizontally reciprocate to operate said springs to control the circuit therethrough, substantially as described.

4. In a desk set, the combination with a desk stand having a tubular standard and a hollow base, of a switch hook consisting of an elbow lever pivoted within said tubular standard at the angle of said lever, one arm of said lever extending outside the standard from which the receiver of the set is adapted to be suspended when not in use and the other arm extending down within the tubular standard to the base, said arms forming a single rigid member, and a set of switch contacts within the hollow base and placed perpendicular to said downward extending arm and adapted to be actuated by the horizontal movement of said latter arm, substantially as described.

5. In a desk set, the combination with a stand having a tubular standard and a hollow base, of a switch-hook consisting of an elbow lever pivoted within said standard and having one arm projecting outside through an aperture in the same from which the receiver is adapted to be suspended and the other arm passing down inside the said standard, and a set of switch springs carrying contacts placed horizontally within the base and controlled by horizontal movement of said latter arm, substantially as described.

6. In a desk set, the combination with a stand having a tubular standard and a hollow base, of a switch-hook consisting of an elbow lever suitably pivoted within said standard and having one arm projecting outwardly from the same from which the receiver is adapted to be suspended, and the other arm passing down inside the said standard and into the base, and a set of switch contacts within the base and actuated by the horizontal movement of the lower end of said latter arm, substantially as described.

7. In a desk set, the combination with a stand having a tubular standard and a hollow base, of a switch-hook consisting of an elbow suitably pivoted within said standard and having one arm projecting outwardly from the same from which the receiver is adapted to be suspended, and the other arm passing down inside the said standard and into the base, and a set of switch spring contacts within said base having their free ends extending into proximity with the lower end of said latter arm, the said end of said arm having a horizontal motion and a wedge like action between said springs to suitably operate the same in the vibration of the switch-hook, substantially as described.

8. In a desk set, the combination with a stand having a tubular standard and a hollow base, of a switch-hook consisting of an elbow lever suitably pivoted within said standard and having one arm projecting outwardly from the same from which the receiver is adapted to be suspended, and the other arm passing down inside the said standard and into the base, a set of switch springs within the base and having their free ends extending into proximity with the lower vibrating end of said latter arm, two rollers carried upon said end of the arm and adapted to engage the said free ends of the springs to operate them, the rubbing surfaces of said springs being opposite said rollers, substantially as described.

9. In a desk stand, the combination with a stand having a tubular standard and a hollow base, of a switch hook consisting of an elbow lever suitably pivoted at the upper end of said standard and having one arm projecting outwardly from the same from which the receiver is adapted to be suspended, and the other arm passing down inside the said standard and into the base, a set of switch springs within the base having their free ends extending into proximity with the lower vibrating end of said latter arm, two rollers carried one above the other on said end of the arm and adapted to engage the said free ends of the springs to operate them, the rubbing surfaces of said springs being offset to bring one opposite each said roller and upon opposite sides of the same, substantially as described.

10. In a desk set, the combination with a stand having a tubular standard and a hollow base, of a switch hook consisting of an elbow lever suitably pivoted within said standard and having one arm projecting outwardly from the same from which the receiver is adapted to be suspended and the other arm passing down inside the said standard and into the base, a set of switch springs

within the base having their free ends extending into proximity with the lower end of said latter arm and with their opposite edges cut away at their free ends to present offset rubbing surfaces, a pair of rollers journaled one above the other upon the lower end of said arm and adapted to engage said offset ends respectively as they move between said springs, substantially as described.

11. In a desk set, the combination with a stand having a tubular standard and a hollow base, said standard including a suitable removable head, of a switch-hook consisting of an elbow lever pivoted to said head and having one arm projecting outwardly from the standard from which the receiver is adapted to be suspended, and the other arm passing down inside the said standard and into the base, and a set of switch springs mounted within said hollow base and having their free ends extending into proximity with the lower end of said latter switch arm, said end of the arm having a wedge like movement lengthwise of and between said springs to actuate the same, substantially as described.

12. In a desk set, the combination with a stand having a tubular standard and a hollow base, of a switch hook lever suitably pivoted within said standard and having an arm projecting from the standard upon which the receiver is adapted to be suspended, and a longer arm extending down inside said standard to the base, switch contacts within the base controlled by said latter arm, and means intermediate the lower end of said long arm and said contacts tending to regain the power lost by the arms of the lever, substantially as described.

13. In a desk set, the combination with a stand having a tubular standard and a hollow base, of a switch hook lever suitably pivoted at the top of the standard and having a short arm projecting from the standard to support the receiver, and a long arm passing down inside the tubular standard to the base, the lower end of said long arm having a comparatively wide amplitude of vibration, switch contacts in the said base actuated by said lower end, and means for making said lower end effective substantially throughout its vibration in actuating said contacts, substantially as described.

14. In a desk set, the combination with a stand having a tubular standard and a hollow base, of a switch hook lever suitably pivoted within said standard and having a short arm projecting from the standard from which the receiver is adapted to be suspended, and a long arm passing down inside the tubular standard to the base, said arms being secured together to form a single rigid member and the lower end of said long arm having a comparatively long range of movement, switch contacts in said base actuated by said lower end, and means for increasing the effect of said end upon said contacts, whereby the power lost by the inverse ratio of said arms is regained through the said means, substantially as described.

15. In a desk set, the combination with a stand having a tubular standard and a hollow base, of a switch hook consisting of an elbow lever suitably pivoted at the upper end of said standard and having the shorter arm projecting outwardly from the same to support the receiver, and the longer arm passing down inside the said standard and into the base, the lower end of said latter arm having a comparatively wide amplitude of vibration, a set of switch contacts, a member against which the said lower end of the switch arm acts to control said contacts, said member being disposed adjacent the path of movement of said lower end and having a long but slight incline against which the said end acts, whereby the power lost by the length of said long arm is regained by the said long and slight incline of said member, substantially as described.

16. In a desk set, the combination with a stand having a tubular standard and a hollow base, of a switch-hook lever suitably pivoted within said standard and having a short arm projecting from the standard from which the receiver is adapted to be suspended and a long arm extending down through the hollow standard to the base, said arms being secured together to form a single rigid member and the lower end of the said long arm having a comparatively long range of movement in its vibration, a set of switch spring contacts in said hollow base, a spring of the set having its free end adjacent the said lower end and provided with a comparatively long and slightly inclined rubbing surface against which said end acts to suitably actuate said contacts, whereby said end is effective through a wide range in actuating said contacts, substantially as described.

17. In a desk set, the combination with a stand having a tubular standard and a hollow base, of a switch-hook lever suitably pivoted at the top of the standard and having a short arm projecting from the standard from which the receiver is adapted to be suspended, and a long arm extending down, through the hollow standard to the base, said arms being secured together to form a single rigid member and the lower end of said long arm having a comparatively long range of movement in its vibration, a set of switch springs in the base actuated by said lower end, the free end of a spring of the set being upon each side of said lower end and provided with a comparatively long and slightly inclined rubbing portion with which said lower end engages, said lower end being arranged to move between said portions

with a wedge like action to spread them apart and thereby make the desired circuit changes, substantially as described.

18. In a desk set, the combination with a stand having a tubular standard and a hollow base, of a switch-hook lever suitably pivoted at the top of the standard and having a short arm projecting from the standard from which the receiver is adapted to be suspended, and a long arm extending down through the hollow standard to the base, said arms being secured together to form a single rigid member and the lower end of the said long arm having a comparatively long range of movement in its vibration, a pair of rollers carried by the said lower end, a set of switch springs within the hollow base, a spring of the set adjacent each said roller and on opposite sides of the lower end, said free ends having comparatively long and slightly inclined rubbing surfaces against which the respective and adjacent rollers act, substantially as described.

19. In a desk set, the combination with a stand having a tubular standard and a hollow base, of a switch-hook lever suitably pivoted at the top of the standard and having a short arm projecting from the standard from which the receiver is adapted to be suspended, and a longer arm extending down through the hollow standard to the base, said arms being secured together to form a single rigid member and the lower end of the said long arm having a comparatively wide range of movement in its vibration, said lower end carrying a pair of rollers one above the other, a set of switch springs within the base having the free end of a spring upon either side of said lower end and with their rubbing surfaces offset and adjacent the respective rollers, said rubbing surfaces being comparatively long and slightly inclined, whereby the said lower end is effective throughout its movement, substantially as described.

20. In a desk set, the combination with a stand having a tubular standard and a hollow base, of an angle shaped switch hook pivoted within the standard and having one of its limbs extending out through an aperture in the standard and adapted to support the receiver when not in use, and the other of its limbs extending downward within the standard below the opening at the bottom thereof, a pair of rollers upon the end of said downwardly projecting limb of the switch-hook, a pair of switch-springs adapted to be engaged, one by each of said rollers, whereby the lower end of said switch-hook limb may have a comparatively long engagement with the said switch springs with very slight friction between the movable parts, substantially as described.

21. In a desk set, the combination with a stand having a tubular standard and a hollow base, of a switch hook consisting of an elbow lever suitably pivoted within the standard and having one arm projecting from the same upon which the receiver is adapted to be suspended, and the other arm passing down inside the standard and into the base, a set of horizontally disposed switch springs secured within the base with their edges vertically arranged to render their contacts visible from beneath, and means for operating the springs by the horizontal movement of the lower end of the adjacent arm of the switch-hook, substantially as described.

22. In a desk set, the combination with a stand having a tubular standard and a hollow base, of a switch hook pivoted within the standard and having an outwardly extending arm upon which the receiver of the set is adapted to be suspended when not in use, a set of switch springs mounted within the base edgewise to the bottom thereof to render their contacts visible from beneath, and a member operated by said switch hook arranged to move horizontally between said springs with a wedgelike action to suitably operate the same, substantially as described.

23. In a desk set, the combination with a stand having a tubular standard and a hollow base, of a switch-hook consisting of an elbow lever suitably pivoted within the standard and having one arm projecting from the same upon which the receiver is adapted to be suspended, and the other arm passing down inside the standard and into the base, a set of parallel switch springs horizontally disposed within the base edgewise to the bottom of the stand, whereby the contacts of the springs are visible from beneath, the free ends of the operating springs being upon opposite sides of the lower end of the latter arm which is arranged to move horizontally between said ends with a wedge-like action to spread said free ends apart to thereby suitably actuate the said set of springs, substantially as described.

24. In a desk set, the combination with a stand having a tubular standard and a hollow base, of a switch-hook consisting of an elbow lever suitably pivoted at the upper end of the standard and having one arm projecting from the same upon which the receiver is adapted to be suspended, and the other arm passing down inside the standard and into the base, a set of switch springs within the base actuated by the lower end of said latter arm, and a spring also within said base and connected with the lower end of said arm to move the same in one direction when the receiver is removed from the other arm, substantially as described.

25. In a desk set, the combination with a stand having a tubular standard and a hollow base, a switch hook suitably mounted within the standard on which the receiver of the set is adapted to be hung when not in

use, switch contacts of the set controlled by said switch hook, a coil included in the electric circuit of the set wound upon a spool one end of which is extended laterally beyond the circumference of the spool and coil, and a screw passing through said lateral extension of the end of the spool and into the upper wall of the hollow base to secure the spool endwise therein, said spool being of such length as not to project below the plane of the lower edge of the base, substantially as described.

26. In a telephone desk set having a hollow base, the combination of springs mounted within the base in vertical arrangement rendering the contacts visible from beneath, and means to actuate said springs, substantially as described.

27. In a telephone desk set having a hollow base, the combination with a plurality of springs mounted within the base, contacts carried upon said springs in plain view from beneath the base, and means for actuating said springs, substantially as described.

28. In a telephone desk set having a hollow base, the combination of a plurality of horizontally arranged switch springs, the surfaces of said springs being arranged in substantially vertical planes, contacts carried upon said springs in plain view from beneath the stand, and means for actuating the springs, substantially as described.

29. In a telephone desk set, the combination with a hollow base, of a set of switch springs carried within the base, contacts carried by said springs, each of said contacts being visible from directly beneath the base, a receiver hook, and means for actuating said contacts when the receiver is removed from its hook, substantially as described.

30. In a telephone desk stand, the combination with a hollow base, of a pair of leaf switch springs horizontally mounted within the base, the flat surfaces of said springs being in substantially vertical planes, whereby the springs are readily accessible from beneath the stand for purposes of adjustment, substantially as described.

31. In a telephone desk stand, the combination with a hollow base, of a pair of leaf switch springs horizontally mounted within the base, the flat surfaces of said springs being in substantially vertical planes, switch points carried by the springs, the points of contact of said switch points being visible from beneath the stand, substantially as described.

32. In a telephone desk stand, the combination with a hollow base, of a tubular standard secured to the base, a switch hook for supporting a receiver, switch springs in the base of the stand, means for actuating said springs by the movement of said switch hook, contacts carried upon said springs, said contacts being in position plainly visible and easily accessible from the base of the stand, substantially as described.

33. In a telephone desk stand, the combination with a hollow base, of circuit controlling switch springs in the base, contacts carried by the switch springs, the point of contact being visible from beneath the base, substantially as described.

Signed by me at Chicago, county of Cook, State of Illinois, this 31st day of December, 1903.

WILLIAM W. DEAN.

Witnesses:
E. A. GARLOCK,
ROBERT LEWIS AMES.