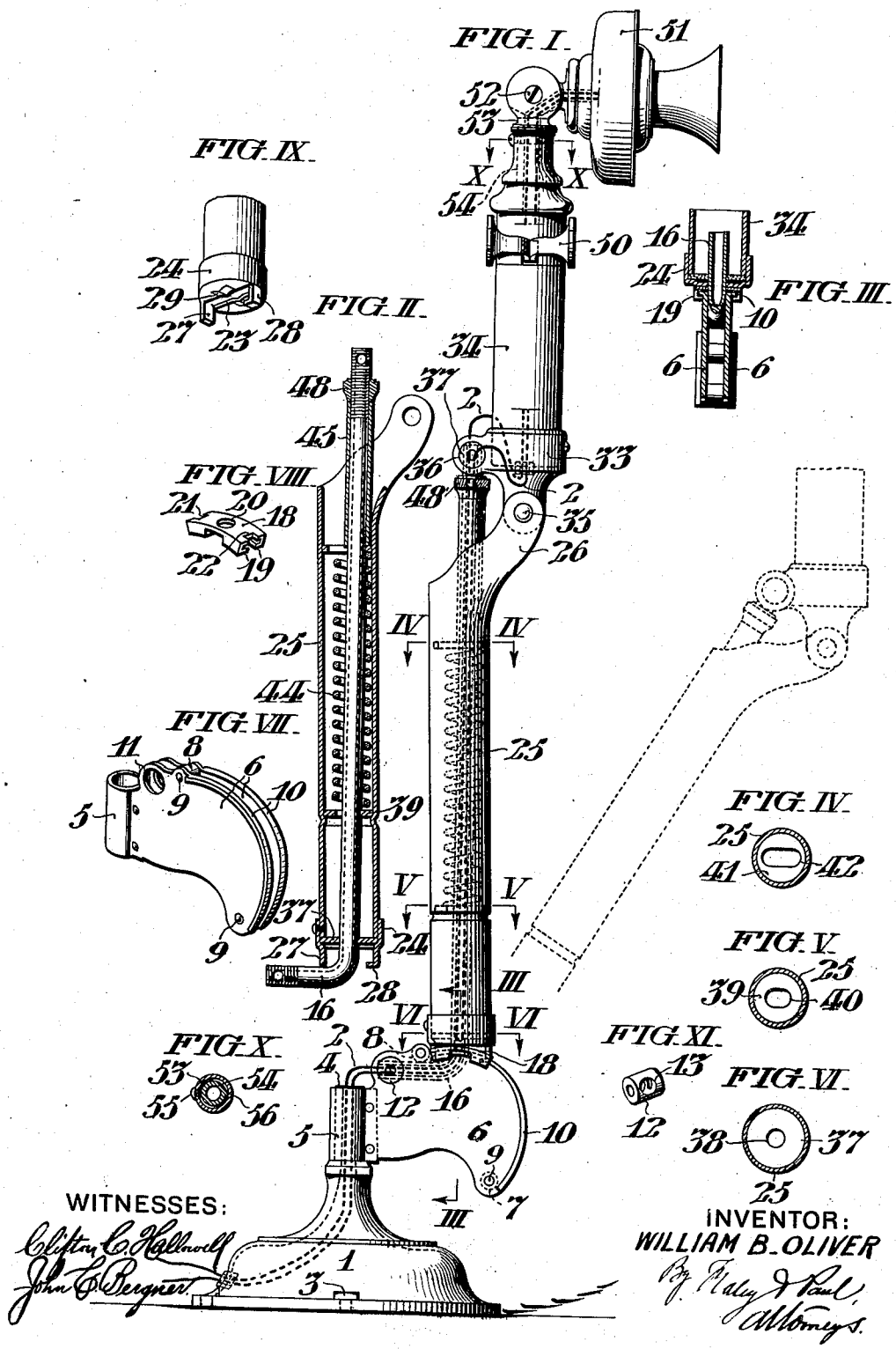
No. 858,821. PATENTED JULY 2, 1907.

W. B. OLIVER.

ADJUSTABLE SUPPORT.

APPLICATION FILED SEPT. 13, 1906.



UNITED STATES PATENT OFFICE.

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ADJUSTABLE SUPPORT.

No. 858,821. Specification of Letters Patent. Patented July 2, 1907.

Application filed September 13, 1906. Serial No. 334,396.

To all whom it may concern:

Be it known that I, WILLIAM B. OLIVER, of Sharon Hill, in the county of Delaware and State of Pennsylvania, have invented certain new and useful Improvements in Adjustable Supports, whereof the following is a specification, reference being had to the accompanying drawings.

My invention relates to an elongated support comprising a standard pivotally mounted upon a base, and having spring-actuated balancing mechanism whereby the support, as a whole, may be automatically retained at any inclination within the range of its pivotal movement; such support having, moreover, the capacity of maintaining an article carried thereby, or attached thereto, in predetermined relation to the vertical.

As this class of supports is very largely employed for telephone instruments, I have shown and described the same as adapted to such use, there being moreover certain special features of improvement which relate directly to this specific embodiment as distinguished from the broader applications of my invention.

In the accompanying drawings, Figure I, represents a side elevation of a support comprising at its upper portion a telephone switch box, with receiver hook and transmitter. Fig. II, is a partial vertical section through the standard, showing certain details of the spring-actuated balancing elements. Fig. III, is a partial sectional view on a plane at right angles to that shown in Fig. I, on the line III, III, looking in the direction of the arrows. Figs. IV, V, and VI, are transverse sections on the lines indicated by the corresponding numbers, also looking in the direction of the arrows. Fig. VII, is a view in perspective of the cam with which the spring actuated balancing mechanism operatively engages. Fig. VIII, is a view of the shoe which is interposed between the same and the lower end of the standard. Fig. IX, is a view in perspective of the lower end of the standard. Fig. X, is a transverse sectional view through the upper portion of the telephone instrument, on the line X, X. Fig. XI, is a detail view of one of the trunnion shaped nuts which constitute the journals of the link comprised in the balancing mechanism.

The base 1, may be of any desired configuration, being preferably hollow to permit the passage of the telephone circuit wires 2, and is secured in this instance to a horizontal surface by means of screws 3. A vertical post 4, rises centrally from the upper portion of the base and receives in pivotal relation the sleeve 5, to which a pair of cam pieces 6, 6, are secured. Said cam pieces are separated by distance bushings 7, 8, and rigidly secured together by means of rivets or other fastenings 9. Laterally projecting flanges 10, 10, are formed along the periphery of each of the engaging surfaces of the cam pieces 6, 6. In rear of the engaging surface, and between it and the sleeve 5, circular openings 11, are formed in the cam pieces to afford bearings for a trunnion nut 12, (see Fig. I), whose general construction is shown in Fig. XI. Said trunnion nut 12, is perforated centrally of its length in a direction perpendicular to its axis as shown at 13, and the opening is threaded so as to engage with the correspondingly threaded lower end of the bent link 16, shown in Fig. II, and in dotted lines in Fig. I. The construction of said link and its relation to the other parts will be described later on.

Sliding freely upon the cam pieces 6, is a shoe 18, having downwardly depending and inwardly projecting flanges 19, on each side, adapted to engage beneath the flanges 10, 10, upon the cam pieces, a fiber washer (see Fig. III), being inserted within the recess on the under side of the shoe, so as to receive the wear and to facilitate renewal when necessary. Said shoe has the general periphery of its upper and lower surfaces curved, as indicated in Fig. VIII, in general conformity with the curved outline of the cam surfaces. A central hole 20, is formed in the shoe, through which the link 16, above referred to, passes.

At the respective ends of the shoe are square recesses 21, 22, adapted to receive and permit engagement with correlative parts on the lower end of the standard 25. This standard is an elongated tubular member having at its upper end a laterally projecting arm 26, and at its lower end a removable cap 24, upon the lower face of which is a downwardly projecting lug 27, and a second lug 28, the lower end of which is turned inwardly toward the center of the standard. Between said lugs is an elongated slot 23, and upon each side of said slot a shallow wedge-shaped lug 29, is formed. The lug 27, extends down through the recess 21, in the rear end of the shoe, and the lug 28, engages, by means of its inwardly projecting lower end, in the recess 22, at the other end of the shoe.

The wedge-shaped lugs 29, on the bottom of the standard, bear upon the upper surface of the shoe at or near its central portion, so as to permit a slight tilting or rocking of the standard as a whole with relation to the shoe. The arm 26, at the upper end of the standard, carries a socket 33, which may be of any desired form, but which in this instance, is shown as a ring adapted to embrace the lower end of the switch box or stem 34, of a telephone instrument, the socket 33, being pivotally connected to the arm at 35. The socket has a second pivotal connection at the point 36, at which point the upper end of the link 16, is attached to a trunnion nut 37, similar to that shown in Fig. XI, and journaled in the rearwardly projecting portion of the socket. The link 16, is a rigid tube which extends down through the standard 25, and, emerging at the bottom thereof through the slot 23,

passes through the opening 20, in the shoe 18, to a point between the cam-pieces 6, where it is bent at a right angle and terminates at the screw connection with the trunnion nut 12. The link is made tubular to permit the passage of the telephone wires 2, 2, as indicated. The link, thus constitutes a rigid connection between the pivotal point at 36, of the socket 33, and the pivotal point at 12, in the rear part of the cam pieces 6.

Immediately adjacent to the lower end of the standard 25, and within the cap 24, is a fixed washer or disk 37, having a central opening 38, which permits the free passage of the link at that region. At a point somewhat higher up in the standard and indicated by the section lines of Fig. V, a second transverse washer 39, is rigidly secured across the tubular interior of the standard, said washer having an elongated central opening 40, which permits the passage of the link and affords a certain amount of play therefor in a direction coincident with the plane of movement of the standard.

Near the upper end of the standard a third washer 41, having a still more elongated opening 42, is freely mounted within the tubular interior, so as to be capable of moving longitudinally with relation to the standard 25. A coiled spring 44, is mounted between and abuts against the washers 39, and 41, in such relation thereto as to be capable of compression by longitudinal movement of the washer 41, in a downward direction within the tube. The movement of the washer 41, is effected by means of an elongated sleeve 45, whose lower end bears upon said washer. Said sleeve slides freely upon the upper portion of the link 16, and is longitudinally adjustable thereon, by means of a thumb nut 48, which engages with the threaded upper extremity of the link 16, (see Fig. II.) This longitudinal adjustment of the sleeve permits the proper tension to be exerted upon the spring so as to compensate for the weight to be carried by the support.

In so far as relates to the support proper, and irrespective of the particular object carried thereby, the features just described comprise the essentials of my invention and the operation thereof is as follows:—When the standard 25 is swung downwards from its normal vertical position as indicated by the dotted lines, the shoe 18, slides upon the operative surface of the cam pieces 6, 6, and by reason of the fixed relation between the pivotal points of the link 16, at 36, and 12, the standard 25, will be compelled to move longitudinally with relation to the link in accordance with the radial distance of the cam surface from the center of oscillation at the point 12. This relation will maintain the socket 33, in a constant relation to the vertical. At the same time, the fixed washer at 39, and the movable washer 41, (which last mentioned washer is in fixed relation to the link itself), will cause compression of the spring 44, so as to afford a constantly increasing resistance to the tilting movement. By properly proportioning the spring, its compression may be made to exactly compensate the gravitative effect due to the different positions of the support and weight carried thereby. Hence the socket 33, or any object mounted therein may be maintained in a predetermined relation to the vertical and the standard as a whole will be retained against the action of gravity in any position within the range of its pivotal movement.

Referring now to the telephonic device which is here shown as mounted in the support 33, said device comprises a switch box or stem 34, and an ordinary receiver hook 50, (the receiver itself not being shown), and also carries within the switch box 34, the usual switch devices common in telephone instruments, which cooperate with the receiver hook. The transmitter casing 51, is pivoted upon a horizontal axis at 52, to a short vertical sleeve 53, which is rotatively supported upon a central hollow post 54, (see Fig. X), a screw stud 55, being provided to engage with the stop 56, on the exterior of the post 54, so as to prevent a complete rotation of the transmitter upon said post. The wires pass down as indicated by the dotted lines through said hollow post and the circuit is established through the instrument as above indicated.

Having thus described the mechanical structure and operation of the parts, I will now point out certain advantageous features which, in addition to more obvious ones, are the notable results of the device.

The shoe 18, which, in the instance shown is interposed between the cam surface and the standard of the support, slides upon the cam surface with a friction which varies substantially in accordance with the weight of the support and object carried thereby, since the longitudinal moving element of the support (which in this instance is the standard 25,) directly sustains the weight and also directly bears upon the shoe 18, with a thrust corresponding with the weight. This feature permits relatively wide variations of load to be provided for without the necessity of modifying the spring-balancing mechanism and without positively locking the structure or interfering with its free manual movement. This use of a brake member, whose frictional engagement, between two of the elements of the support, varies in proportion to varying loads which may be placed upon the article-carrying device, is a wholly new feature in this class of apparatus and is not dependent upon the particular form of the counterpoising mechanism nor upon the particular form or location of the frictional element itself.

Furthermore, it will be noted that in so far as relates to the specific embodiment of the invention in a telephone support, there are certain features of special advantage. The switch box or stem 34, is of sufficient length to act as a guard for the receiver when the latter is hung upon its hook 50, and since this stem 34, is always maintained in a vertical position, the lower end of the receiver will, in any position of the support, be protected from coming in contact with a desk or other adjacent object, even when the arm 25, is swung into a horizontal position. The stem 34, and subjacent parts, thus act as a substantially complete shield for the receiver when in position upon the hook.

It will also be seen that the mouth piece of the transmitter is accessible throughout a range of horizontal rotative adjustment corresponding in extent to substantially an entire circle, and at the same time it will, in such rotation, clear the adjacent parts and thus avoid disturbance of the receiver. This arrangement is greatly superior to one in which the entire stem, including the receiver and its hook, are rotatively mounted since there is always danger of injury to or displacement of the receiver in such case.

I use the term "article carrying device" in my

claims as comprehending not only the specific form of socket which I have indicated at 33, but any element which is adapted to receive and properly hold the desired article. I also use the term "base" as comprehending not merely the specific form indicated at 1, in the drawings, but any means of mounting a support, as a whole, either by attachment to a fixed surface or otherwise.

The terms "standard" and "link" are employed to conveniently designate the two members whose relative longitudinal motion contributes both to the self balancing action and to the maintenance of the article carrying device in definite relation to the horizontal. It is obvious, however, that such designation is merely descriptive, since the member which I have termed the link might with equal propriety be considered as the standard.

The characteristic features of these elements are that only one thereof is pivotally attached at both ends, while the other is free at one end but in operative relation to a cam, thus differing substantially from the class of "so called parallel motion" devices, which comprise four points of pivotal attachment.

I claim:—

1. In a support, the combination with a base and a cam supported thereby; of an article carrying device and a pair of elongated members pivotally attached thereto, one of said members being also pivotally attached at a fixed point in juxtaposition to said cam, the other member being mounted to swing in operative relation to said cam.

2. In a support, the combination with a base; of a laterally projecting cam; a standard mounted to swing in the plane of said cam; an article-carrying device, pivotally connected to said standard; and, a link connected at one end with said article-carrying device and at the other end at a fixed point in juxtaposition to said cam.

3. In a support, the combination with a base; of a laterally projecting cam; a standard mounted to swing in the plane of said cam; an article-carrying device, pivotally connected to said standard; a link connected at one end with said article-carrying device and at the other end at a fixed point in juxtaposition to said cam; and, a frictional member arranged between the surface of said cam and the end of said standard.

4. In a support, the combination with a base; of a laterally projecting cam; a standard mounted to swing in the plane of said cam; an article-carrying device, pivotally connected to said standard; a link connected at one end with said article-carrying device and at the other end at a fixed point in juxtaposition to said cam; a frictional member arranged between the surface of said cam and the end of said standard; and a spring, housed in the standard, operatively engaging said link and said standard and adapted to resist relative movement thereof.

5. In a support, the combination, with a base, of a standard mounted to swing with relation thereto; an article-carrying device pivoted to said standard; a link carried by said standard and pivotally connected to said article-carrying device; and a cam operatively arranged to shift said standard with relation to said link during swinging motion, whereby the article-carrying device is maintained in a predetermined position during said swinging motion.

6. In a support, the combination, with a base, of a standard mounted to swing with relation thereto; an article-carrying device pivoted to said standard; a link carried by said standard and pivotally connected to said article-carrying device; a cam operatively arranged to shift said standard with relation to said link during swinging motion; and means for yieldingly and increasingly resisting said relative motion during the swing of said standard in a predetermined direction.

7. In a support, the combination with a base; of a cam mounted to rotate thereon and having its operative surface arranged in a plane coincident with the axis of rotation; a standard adapted to frictionally engage the operative surface of said cam; an article-carrying device pivotally connected to said standard; and a link pivotally connected to said article-carrying device and at a fixed point in juxtaposition to said cam.

8. In a support, the combination with a base; of a cam mounted to rotate thereon and having its operative surface arranged in a plane coincident with the axis of rotation; a standard adapted to frictionally engage the operative surface of said cam; an article-carrying device pivotally connected to said standard; a link pivotally connected to said article-carrying device and at a fixed point in juxtaposition to said cam; and a spring housed in the standard and adapted to resist relative motion between said link and said standard.

9. The combination with a pair of cams having their operative surfaces parallel; of projecting flanges arranged along said operative surfaces; a shoe adapted to embrace said flanges; a link pivotally connected at a point in juxtaposition to said cams and extending through said shoe; a pivotally movable standard adapted to bear upon said shoe; and an article-carrying device pivotally connected with said link and said standard.

10. The combination with a base; of an article-carrying device; a pair of elongated swinging members arranged between the base and the article-carrying device; a pivotal connection, at each end of one of said elongated members, with said article-carrying device and said base respectively; a pivotal connection at one end of the other elongated member; a cam arranged in operative relation to the other end of said last mentioned member; and a spring resisting longitudinal movement of one of said members with relation to the other.

11. In an adjustable support, comprising a base and a plurality of elongated members swinging with relation to said base, one of said members being adapted for longitudinal movement with relation to the other, the combination with said members respectively; of pivotal connections at each end of one member and a pivotal connection at one end only of the other member; and means operatively connected to the non-pivoted end of said last mentioned member for shifting one of said members longitudinally with relation to the other, whereby the relative motion for maintaining said article-carrying device in a predetermined position during the swing of said support is effected about a single fixed pivot.

12. In a support, the combination with a base; of a standard mounted to swing with relation thereto; spring means to counterpoise the downward swing of the standard; an article-carrying device carried by said standard; means for maintaining the article-carrying device in a predetermined position, throughout the swinging range of said standard; and a frictional brake member adapted to be directly actuated by the thrust of the load whereby frictional engagement of said brake member is automatically varied in proportion to varying loads upon said article-carrying device, while manual movement of the standard is permitted during such frictional engagement.

In testimony whereof, I have hereunto signed my name, at Philadelphia Pennsylvania this eighth day of September 1906.

WILLIAM B. OLIVER.

Witnesses:
JAMES H. BELL,
H. L. TAGGART.