

No. 716,974.

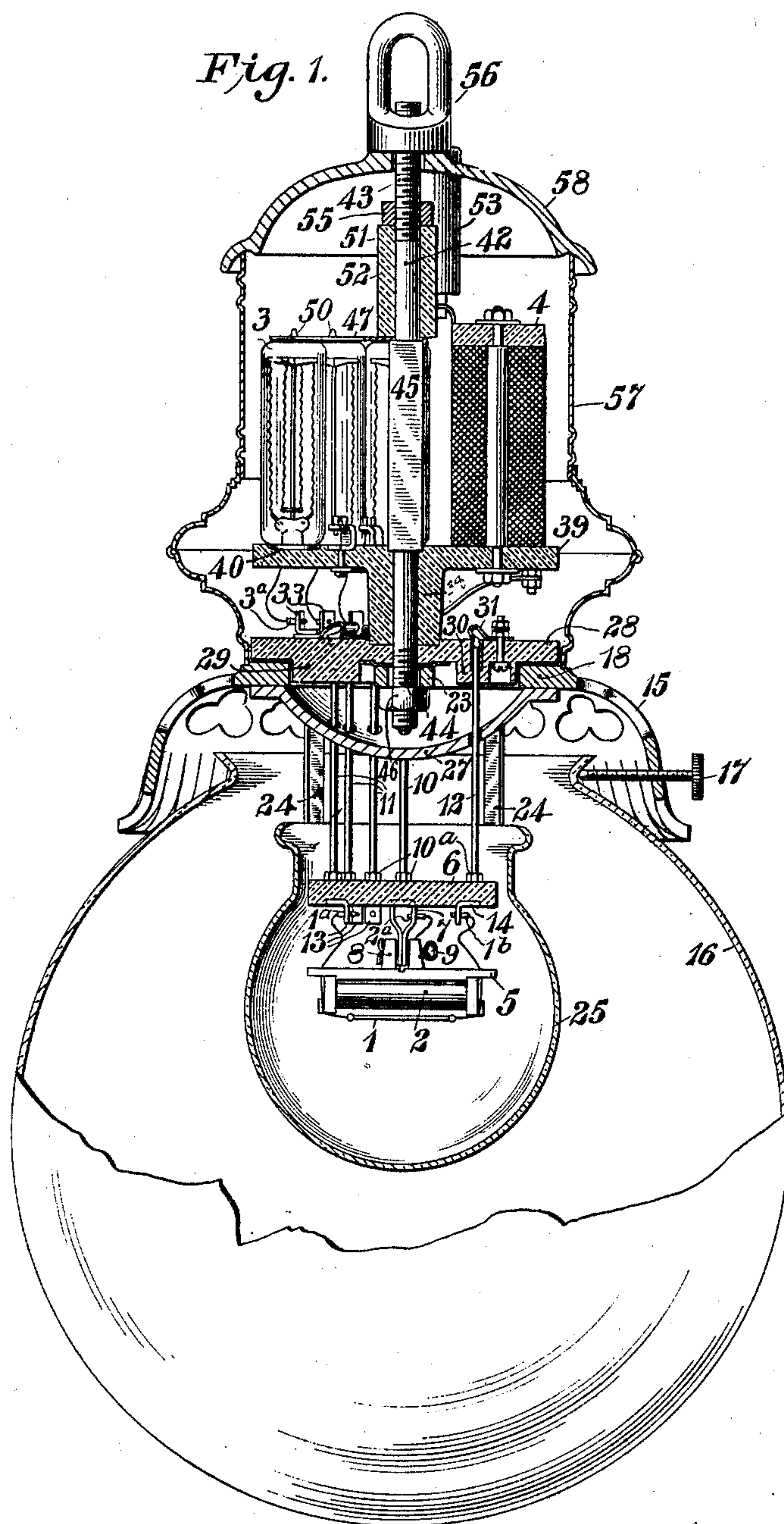
Patented Dec. 30, 1902.

A. J. WURTS.
ELECTRIC LAMP.

(Application filed May 5, 1902.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES:

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B. B. Hines.

INVENTOR

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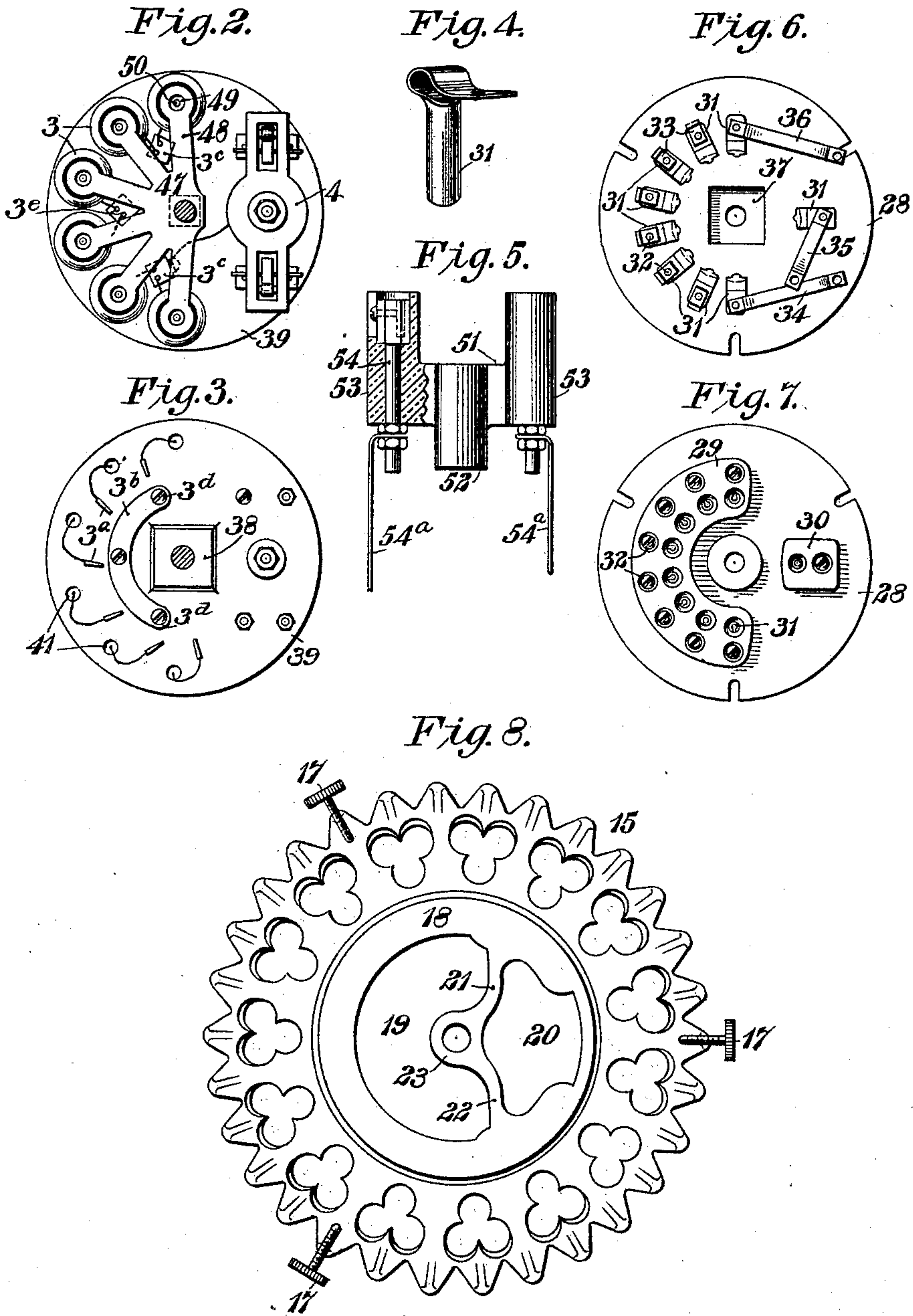
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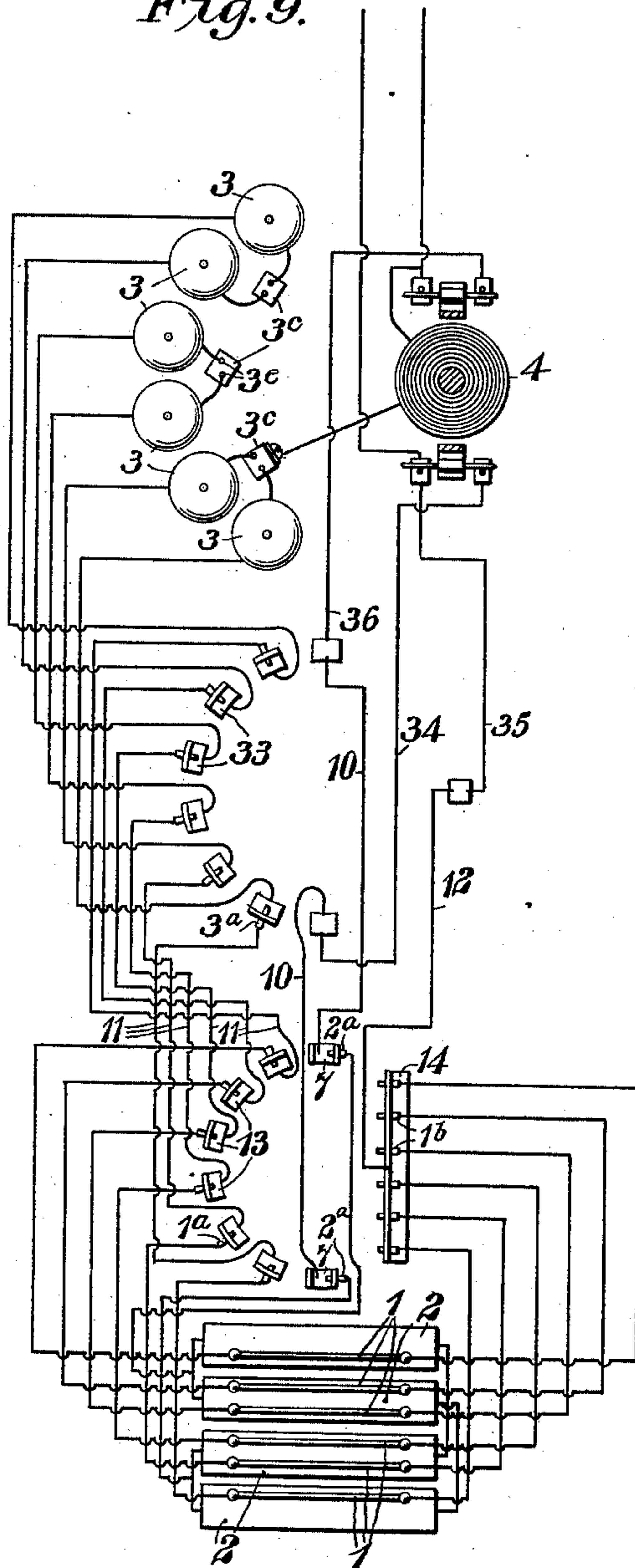
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Fig. 9.



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UNITED STATES PATENT OFFICE.

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ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 716,974, dated December 30, 1902.

Application filed May 5, 1902. Serial No. 106,005. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER JAY WURTS, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Electric Lamps, of which the following is a specification.

My invention relates to electric lamps of the type in which the light-emitting member or element is a non-conductor under ordinary temperatures, but becomes a conductor when heated to a relatively high temperature.

The object of my invention is to so simplify the several parts of the lamp structure and the means for holding them in coöperative relations that they may be readily assembled and as readily separated from each other and to so construct and combine certain of the parts that such of the devices as it may be necessary to renew from time to time may be readily detached and as readily placed in operative position.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a view, partially in side elevation and partially in section, of a lamp constructed in accordance with my invention. Fig. 2 is a plan view of the ballast devices and cut-out and the supporting-plate therefor. Fig. 3 is a plan view of the plate or disk shown in Fig. 2 when reversed. Fig. 4 is a detail perspective view of one of the contact devices shown in Fig. 1. Fig. 5 is a view, partially in front elevation and partially in section, of one of the insulating and contact supporting devices of the lamp. Fig. 6 is a plan view of one of the insulating-supporting disks of the lamp-frame work, and Fig. 7 is a plan view of the disk shown in Fig. 6 when reversed. Fig. 8 is a plan view of the combined metal hood and supporting-plate for the lamp frame work and globe. Fig. 9 is a diagram of the operating parts of the lamp and the connecting-circuits.

The essential operating parts of the lamp comprise the glowers 1, here shown as six in number; the heaters 2, of which four are here shown; the ballast-resistances 3, six of which are shown as respectively connected in series with the six glowers, and a heater cut-out 4,


operating to open the heater-circuit when the glowers become conductive. These essential parts of the lamp do not, either independently or collectively, of themselves constitute parts of my present invention; but the means whereby they are assembled, properly supported in the lamp and connected in circuit with each other, are comprised within my invention.

The glowers 1 and heater-tube 2 are removably supported by a holder 5, of porcelain or other suitable refractory non-conducting material, and this holder is detachably supported from and below a disk 6, of porcelain or other suitable non-conducting material, by means of metal hangers 7, to which lugs 8 on the holder 5 are fastened by cotter-pins 9. These hangers 7 are fastened to the disk 6 by pins 10, the lower ends of which are screwed into the hangers and are also provided with nuts 10^a above the disk. The hangers 7 and pins 10 are located at diametrically opposite points of the disk and constitute heater-terminals. The disk 6 is also provided at one side of the diameter in which the pins are located with a series of six similar pins 11 and at the opposite side of said diameter with one similar pin 12. The lower ends of the pins 11 project through the disk 6 and are screwed into angular metal pieces 13, and the lower end of the pin 12 projects through the disk in a similar manner and is screwed into a longer angular piece 14. Each of the pins 11 and 12 is also provided with a nut 10^a for clamping it and the corresponding angular piece to the disk. Each of the pieces 13 is perforated and receives the terminal plug 1^a of a corresponding glower. The piece 14 has six perforations and receives the terminal plugs 1^b of all of the glowers of the set. The hangers 7 are also perforated at one side to receive the terminal plugs 2^a of the heaters.

As shown in Fig. 9, the tubular heaters are so connected in multiple series that those of each series-connected pair are alternately disposed with reference to those of the other pair. With this arrangement should either pair be disabled the other pair would serve to heat the glowers to conducting temperature.

Located above the heaters and glowers and their supporting-frame is a metal hood 15, which is shown as of fanciful open-work construction in order that it may have a pleasing appearance and also in order to promote ventilation. To this hood is attached a large outer globe 16 by means of suitable screws 17 or otherwise. The hood 15 has a central flat plate 18, provided with two openings 19 and 20, separated by arms or spokes 21 and 22, and a central hub 23. A plurality of spring-arms 24 are fastened at the upper ends to the plate 18 and serve as supports for an inner globe 25, this globe being readily sprung into position and as readily detached when desired. The annular portion of the plate 18 is clamped between a porcelain reflector 27, which is of spherical contour and is provided with perforations, through which the pins 10, 11, and 12 project, and a disk 28, of porcelain or other suitable non-conducting material. This disk 28 has comparatively thick portions 29 and 30, which respectively project through the openings 19 and 20 in the plate 18, and the portion 29 is provided with cylindrical openings, in which are located split metal tubes 31 to receive the pins 10 and 11, and the part 30 is provided with a like opening to receive a similar split tube 31 for the pin 12. Each of these tubes 31 is formed of a strip of malleable metal—such, for example, as aluminum—which for approximately one-half of its length is bent into tubular form and inserted into one of the openings in the disk 28. The remaining portion is left flat and is bent over against the upper surface of the disk and is fastened thereto by a screw and a nut. The pieces 31, with which the glower terminal pins 11 engage, are fastened to the disk by means of screws 32 and nuts in the form of angle-pieces 33, which are perforated to receive the terminal plugs 3^a of the ballast devices 3, and the pieces 31, corresponding to the heater terminal pins 10, are connected to the proper cut-out terminals by means of strips 34, 35, and 36 and suitable clamping screws and nuts. (See Fig. 6.) The split tubular portions of the pieces 31 receive the pins 10, 11, and 12 and are sufficiently yielding to permit of the ready insertion and removal of the pins. By reason of the location of the tubes in cylindrical holes of proper diameter only such expansion is possible as will permit insertion of the pins and at the same time insure a firm gripping action.

The upper face of the disk 28 is provided with a rectangular recess 37, in which rests the lower rectangular end of a boss 38, which projects from and constitutes an integral part of the disk 39, of porcelain or other suitable insulating material. This disk 39 supports the heater cut-out 4 and the ballast devices 3, its upper surface being provided with recesses 40 to receive the lower ends of the ballast-tubes. The disk is also provided with perforations 41, corresponding in number and position to

the ballast devices for the passage of the ballast terminal wires, and also with a metal strip 3^b on its bottom face and -shaped pieces 3^c on its top face, which are mechanically and electrically fastened together by screws 3^d. The several ballast-wires are detachably connected to the pieces 3^c by means of terminal plugs 3^e, each piece 3^c being provided with two holes to receive the corresponding plugs.

A bolt 42, which has cylindrical screw-threaded ends 43 and 44 and an intermediate squared or rectangular portion 45, extends through the boss 38, the disk 28, and the central portion 23 of the plate 18 and is provided below the said part 23 with a clamping-nut 46. Mounted upon this bolt above the squared portion 45 and so as to rest thereon is a plate 47, having six spring-arms 48, corresponding in number and position to the ballast-tubes 3 and having at their outer ends openings 49 to receive the projections 50 on the upper ends of the ballast-tubes. Mounted upon the portion 42 of the bolt and resting upon the plate 47 is a porcelain piece 51, comprising a middle cylinder 52, through which the bolt projects, and two side cylinders 53, in which are located terminal rods 54, to the upper ends of which are connected the outside circuit-wires and to the inner ends of which are fastened the conductors 54^a, which lead to the cut-out terminals. Above the piece 51 is located a nut 55, which, together with the nut 46 and the bolt upon which they are mounted, serves to clamp the intermediate parts together, and thus form a compact rigid structure, the members of which may be readily separated by removing the nuts. The screw-threaded portion 43 projects some distance above the normal position of the nut 55 and receives a nut 56, the upper portion of which is in the form of a loop to serve as a means for suspending the lamp. This nut also serves to fasten the housing of the lamp in position, this housing comprising a main body portion 57 and a dome-shaped cap 58 the cap resting upon the body portion 57 and the latter resting upon the top of the hood 15.

I have not deemed it necessary to either specifically illustrate or describe the heater cut-out, since the form of cut-out which is here indicated is made the subject-matter of another application filed September 28, 1901, Serial No. 76,970, and a cut-out of any suitable form known in the art and capable of use in this type of lamp may be employed.

It will be seen from the foregoing description that the several parts of the lamp are simple in construction and are compactly arranged and also that such parts as it may be necessary to remove from time to time for replacement or repairs may be so removed or replaced without difficulty and without disarrangement of the other parts and that all of the elements of the lamp structure may be

disassociated and reassembled with a minimum amount of labor and with a minimum manipulation of fastening devices.

I claim as my invention—

5 1. In an electric lamp of the type described, the combination with a plurality of glowers and a plurality of ballast devices, of a supporting-frame comprising a plate having recesses for the lower ends of the ballast de-
10 vices and a plate having spring-arms that respectively rest upon the upper ends of the ballast devices.

2. In an electric lamp of the type described, the combination with a plurality of glowers
15 and ballast devices, of a frame comprising a supporting-plate for the ballast devices and a plate having spring-arms for holding the ballast devices removably in position.

3. In an electric lamp of the class described,
20 the combination with a terminal supporting-plate containing contact-tubes, of a glower and heater holder and a supporting structure therefor comprising a non-conducting plate, to which said holder is detachably connected,
25 and having a series of contact-pins adapted to be inserted in the tubes in said supporting-plate to make electrical contact with and, also, mechanically support both the structure and the glower and heater holder.

30 4. In an electric lamp of the class described, an insulating disk or plate having cylindrical holes therein, split tubes inserted in said holes and a glower and heater holder supporting structure having pins adapted to enter said
35 tubes and make supporting, frictional engagement therewith.

5. In an electric lamp of the type described, a metal hood for supporting a globe comprising a rim, a central hub and two spokes connecting the hub with the rim, in combination
40 with an insulating-plate resting upon said rim and having thickened portions which project through the openings between the rim and spokes.

45 6. In an electric lamp of the class described, the combination with a metal hood having an annular rim, a central hub and spokes connecting the hub with the rim, said rim, hub and spokes being in the same plane, of a non-
50 conducting plate or disk resting upon said rim and hub and having thickened portions which project into the spaces between the rim and spokes and are provided with holes, split metal tubes in the holes and a glower
55 and heater supporting structure having pins which are removably fitted into said split tubes and expand the same against the surrounding walls.

7. In an electric lamp of the type described,
60 a terminal supporting-plate of insulating material having cylindrical openings and provided with terminal pieces, portions of which are bent into tubular form and inserted in said openings and the outer portions of which are
65 clamped to the upper face of the plate by means of screws and nuts.

8. In an electric lamp of the type described, a supporting-hood for the lamp-globe, a non-conducting plate or disk and a porcelain reflector having a convex face and means for
70 clamping the hood between said plate and reflector.

9. In an electric lamp of the type described, a non-conducting plate having cylindrical
75 holes provided with split metal tubes, in combination with a spherical reflector fastened to said plate and having openings in alignment with said tubes and a glower and heater supporting structure having supporting and contact-making pins which project through
80 said reflector-openings and into the split metal tubes.

10. In an electric lamp of the class described, the combination of one or more ballast devices, a heater cut-out, circuit-termi-
85 nal pieces, insulating-supports and a housing for said parts, of a single bolt having nuts and serving to clamp said parts together in operative relation.

11. In an electric lamp of the class de-
90 scribed, a globe-supporting base, a support for ballast devices and heater cut-out, and a terminal block, in combination with a bolt extending through said parts and provided with nuts for clamping them together. 95

12. In an electric lamp of the type described, a plurality of insulating, separable supports for the conducting parts of the lamp, a central block on which said parts are mount-
100 ed and nuts for clamping said parts together.

13. In an electric lamp of the class described, the combination with separable, insulating-supports for ballast devices, heater cut-out and terminal connectors, of a two-
105 part housing and a rod extending through said parts and provided with nuts for clamping said parts together.

14. In an electric lamp of the class described, an insulating-block comprising three tubular legs, two of which contain terminal
110 rods.

15. In an electric lamp of the class described, an insulating ballast and cut-out supporting plate having a central, hollow boss projecting from one side thereof. 115

16. A supporting-plate for glower and heater terminal contacts having a polygonal recess in its upper face, in combination with a ballast and cut-out supporting plate having a hollow polygonal boss that fits into said re-
120 cess and means for clamping said parts together.

17. In a lamp of the class described, a housing comprising a globe-hood, a superposed body portion, a cap and a rod or bolt extend-
125 ing through said parts and provided with nuts for clamping them together.

18. In a lamp of the class described, the combination with the glowers, heaters, ballast devices and cut-out and supporting means
130 therefor, of a single bolt for fastening said parts together and an insulating-block hav-

ing terminal rods and mounted upon said main bolt.

19. An electric lamp having separable parts and a central bolt having nuts for clamping 5 said parts together, a multiple-part housing and an outside nut upon the bolt for clamping the parts of the housing together and to the lamp structure.

20. In a lamp of the class described, an insulating, supporting-plate for the ballast devices and heater cut-out having a hollow, central boss, in combination with a main bolt projecting through said boss.

21. In a lamp of the class described, a non-conducting plate having split-tube terminals 15 and a convex reflecting and covering shell fastened to said plate and having holes which register with the split-tube terminals.

22. In a lamp of the class described, a non-conducting plate having glower and heater 20 terminals, and a non-conducting shell having a spherically-curved surface and serving both

as a reflector and as a cover for said terminals.

23. In a lamp of the class described, a plurality of heaters connected in multiple series 25 and those of one series being severally alternated in position with those of the other.

24. In an electric lamp of the class described, the combination with one or more 30 glowers, of a ballast-resistance for each glower, a glass tube for each ballast-resistance, a supporting-plate having a recess for the lower end of each tube, a plate having a spring-arm for each tube and a pad or cushion interposed 35 between each spring-arm and the top of the corresponding tube.

In testimony whereof I have hereunto subscribed my name this 28th day of April, 1902.

ALEXANDER JAY WURTS.

Witnesses:

H. A. CROOK,
MURRAY C. BEEBE.