(No Model.) 2 Sheets—Sheet 1.

F. L. McGAHAN.

ELECTRIC ARC LAMP.

No. 516,574. Patented Mar. 13, 1894.

FIG. 1.

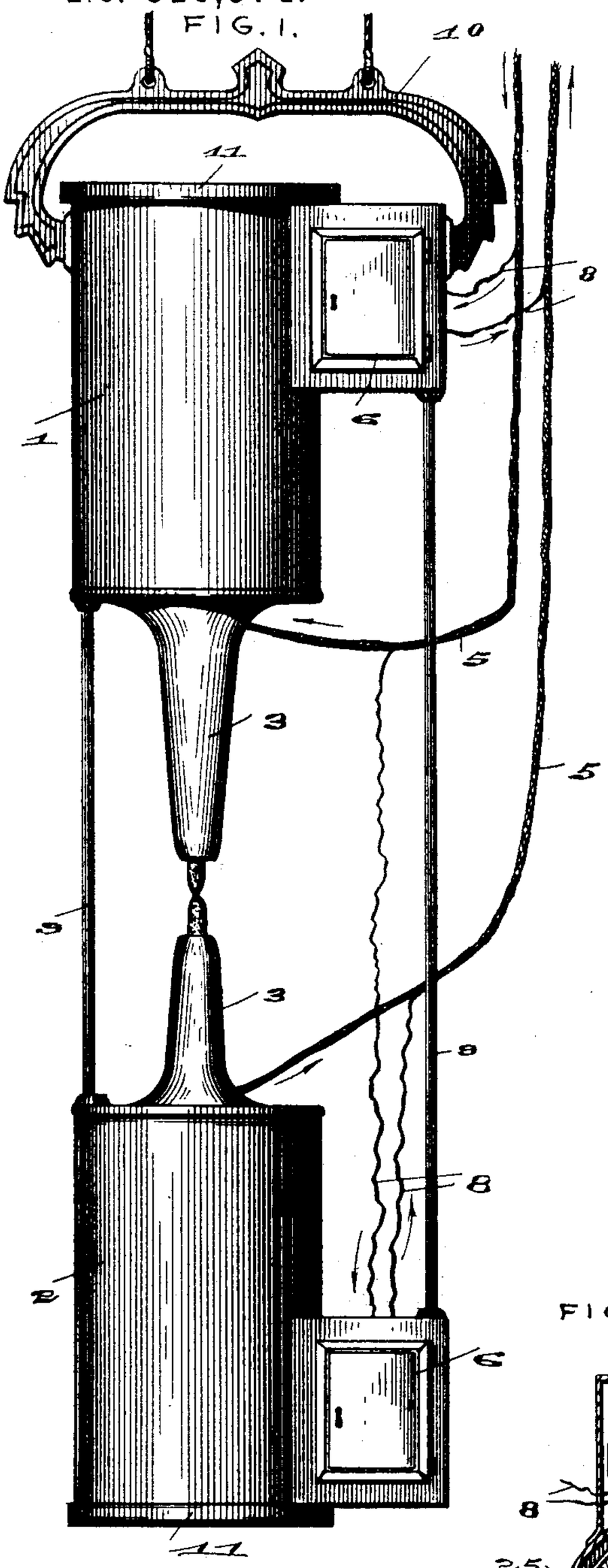


FIG. 2.

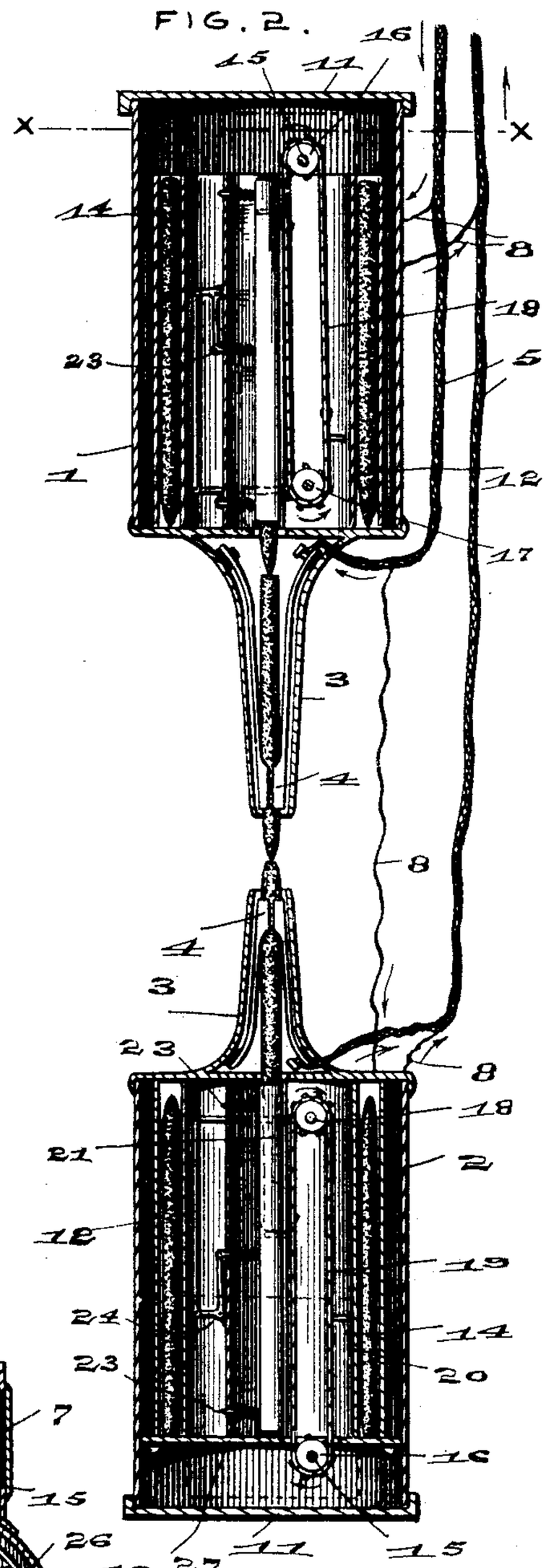
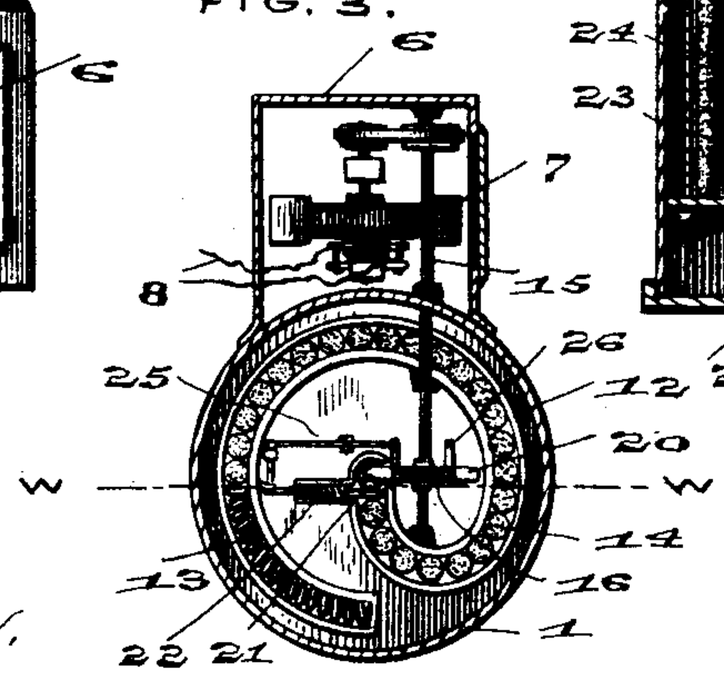


FIG. 3.



Witnesses
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(No Model.) 2 Sheets—Sheet 2.

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ELECTRIC ARC LAMP.

No. 516,574. Patented Mar. 13, 1894.

FIG. 4.

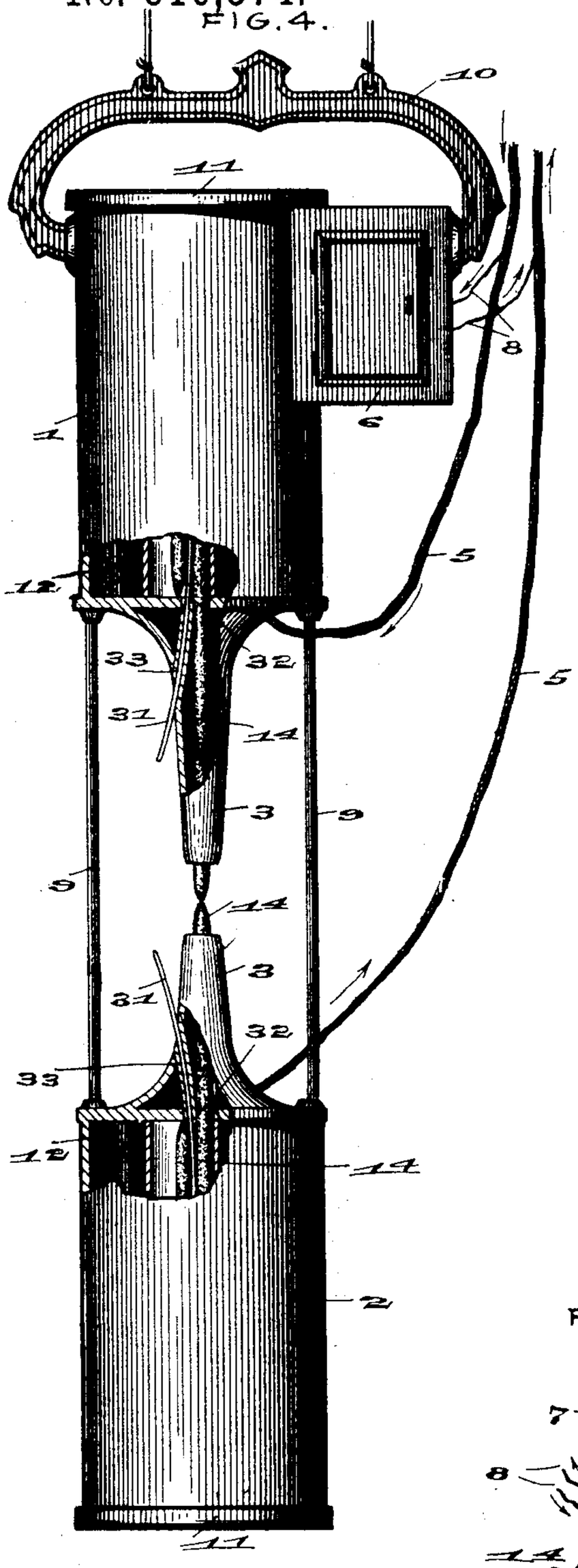


FIG. 5.

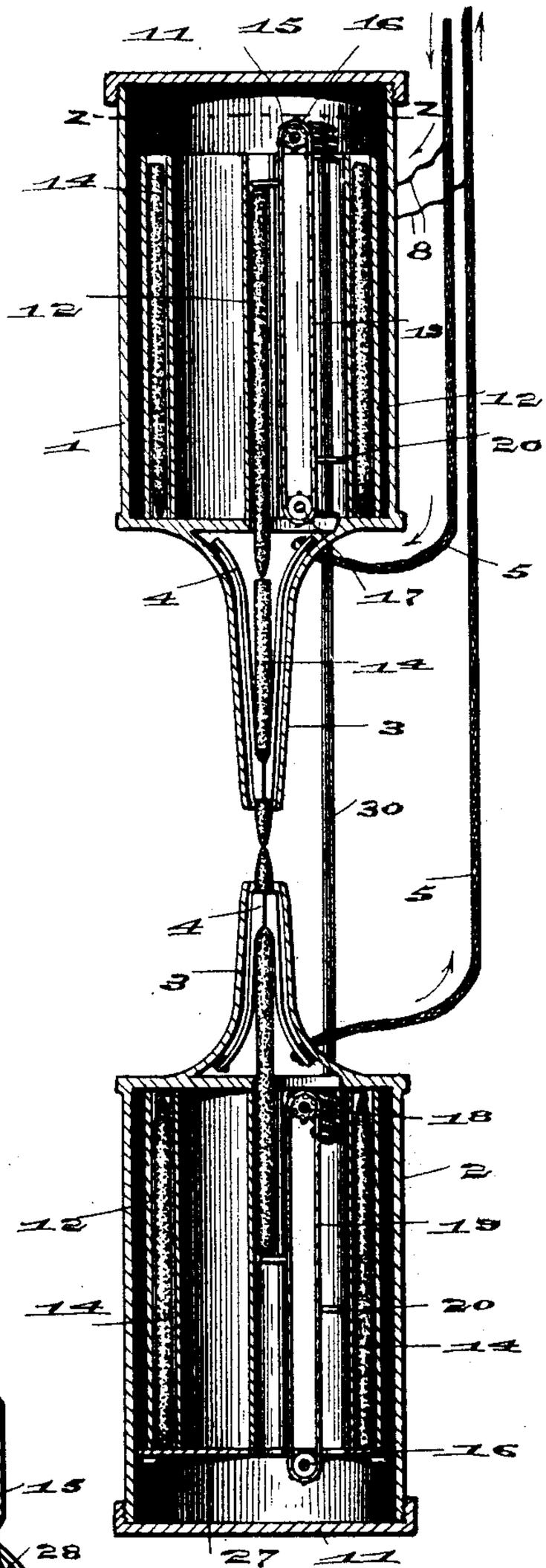
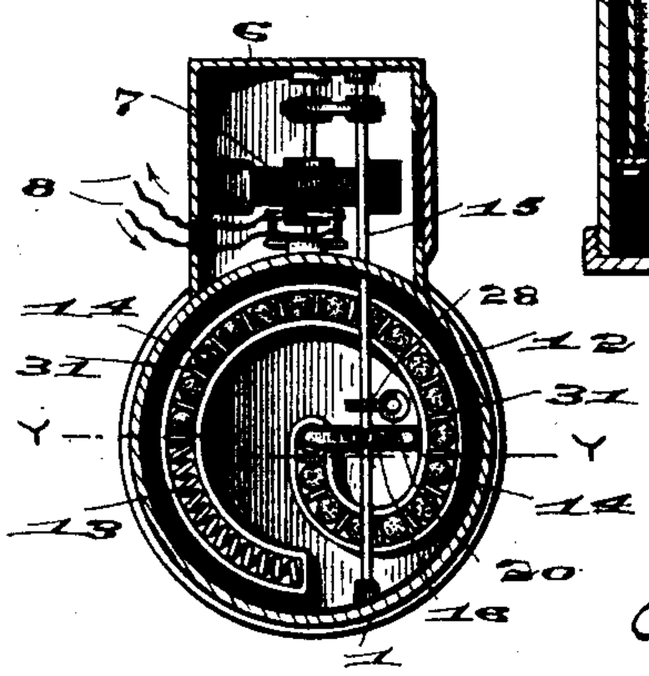


FIG. 6.



Witnesses

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UNITED STATES PATENT OFFICE.

FRED L. McGAHAN, OF INDIANAPOLIS, INDIANA.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 516,574, dated March 13, 1894.

Application filed January 2, 1892. Serial No. 416,897. (No model.)

To all whom it may concern:

Be it known that I, FRED L. McGAHAN, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Electric-Arc Lamps; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to a new and useful improvement in that class of electric lamps known as arc lamps, wherein a light is obtained by passing a current of electricity through two carbons whose ends are contiguous to each other, and it will be fully described in the following specification, and more particularly pointed out in the claims, reference being had to the accompanying drawings in which—

Figure 1 is an elevation of my improved lamp. Fig. 2 is a central vertical section of the same on the line W—W, Fig. 3. Fig. 3 is a cross section on the line X—X, Fig. 2. Fig. 4 is an elevation partly in section of a slightly modified form of my lamp. Fig. 5 is a central vertical section of the same on the line Y—Y, Fig. 6, and Fig. 6 is a cross section on the line Z—Z, Fig. 5.

In detail (1) and (2) are hollow cylinders provided on their inner ends with hollow tapering extensions (3) whose ends are open, and a short distance apart in a vertical line (4) are spring clamps attached to the inside of these extensions and insulated therefrom, and (5) are the main circuit wires connected to the clamps. Each of the cylinders has connected on its sides a small motor box (6) in which is a suitable motor (7) operated by a current from the circuit wires through the loops (8). The two cylinders (1) and (2) and their motor boxes are connected together by the vertical rods (9) thus holding the parts in a firm and rigid position.

(10) is a bracket secured to the upper cylinder and its box, and to which any suitable means for suspending the lamp may be attached. Each of the cylinders are provided with a screw cap (11) on its outer end and by the removal of which the carbons may be inserted in the magazine or holders (12) the upper one of which as shown in plan in Fig. 3 is formed with double walls of a non-conducting material and is of a spiral form with closed ends, its inner one being in the center of the cylinder where an opening is formed into the extension (3).

(13) are coiled springs in the outer end of the magazine and bear against the carbons (14) with which it is filled.

(15) is a shaft having bearings in the motor box (6) and the cylinder, and is driven by the motor (7).

(16) is a sprocket mounted on the shaft (15) and connected to the sprocket (17) on a counter-shaft (18) also having bearings in the cylinder, by a sprocket chain (19) provided with the two projections (20) which are in line with the center of the cylinder and are adapted to work in a slot in the magazine and bear on the end of the carbon which is in line with the central opening, and feed it through the same into the extension (3) when it comes in contact with, and is held lightly by the spring clamps (4).

(21) is an insulating plate which is adapted to cut off the central carbon that is being fed, and a recess (22) is formed in the side of the magazine just in the rear of the central opening, into which the insulating plate can be withdrawn. The back of the plate (21) has three projections (23) all of which have a spring coiled around them to form an elastic backing for the plate, and the projections extend through the back of the recess (22) where the central one is pivoted to a small bell crank lever (24) centrally pivoted to the outer wall of the recess, and its opposite end is connected by a short rod to a lever (25) centrally pivoted to the magazine, its outer end in line with, and adapted to be tripped by one of the lugs (26) on the side of the sprocket chain (19) which are so set as to trip the lever (25) and withdraw the insulating plate from the magazine into the recess (22) at the time when the central carbon has entirely left the magazine, thus allowing the carbon in the rear to be forced forward by the springs (13) and in position to be fed out into the extension (3).

The lower cylinder is provided with a removable plate (27) which forms a base for the carbon magazine (12), but the mechanism in both cylinders is the same, the lower of course being inverted.

In the modification shown in Figs. 4, 5, and 6 the feed mechanism is operated by a single motor (7) in the motor box (6) connected to the upper cylinder (1) and is driven by a current from the circuit wires as in the first case, and driving the shaft (15) of the feed mechanism in the upper cylinder. This shaft as shown in Fig. 6 has mounted thereon a worm wheel (28) and the counter-shaft (18) in the lower cylinder has a similar wheel, each engaging with a worm on the outer end of the vertical rod (30) having bearings in the two cylinders. The lower worm however is much coarser and less angular than the upper; as the lower carbon being consumed slower than the upper, the feed must be slower. In the modification I also do away with the insulating plate (21) and substitute therefor the strips of mica (31) or other non-conducting material which is inserted between each carbon when the magazine is filled, and as the carbons are being fed out of the same, these strips come in contact with the slight projection (32) on the edge of the central opening and are fed out of the lamp through the passages (33) formed in the extensions.

The operation of my lamp is as follows:— The carbon magazines in the cylinders having been filled by the removal of the screw caps on their ends, and two carbons placed with their ends contiguous, the current in the circuit wires passing through the spring clamps (4) and through the carbons held by the clamps, generates the light at the point where the arc is formed, and as the carbons are consumed they are fed out by the pressure of the projections (20) on the sprocket chain, operated through the sprocket wheels from the motor, and as each carbon is being fed out of the magazine, one of the lugs in the side of the sprocket chain trips the lever (25), and through its connections draws the insulating plate (22) back into its recess, allowing the next carbon to take its place over the central opening, and it is fed out behind the first. This operation is repeated until the magazines are exhausted, when they must be refilled.

In the modification the lamp operates in a similar manner only feeding out the mica strips (31) through the openings (33) at the same time it is feeding the carbons in front of it and there being nothing interposed between the first carbon and the second except the mica strip, as soon as the first is free from the magazine the next will be forced in its place by the coiled springs (13) in the rear. The feed mechanism operates in the same manner as the first only that it is of a simpler construction.

I do not wish to limit myself to the precise construction herein shown as other variations might be made in my lamp, such as substituting clock-work of any ordinary spring motor for the electric motor, without departing from the spirit of my invention.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an electric arc lamp the combination of a casing, a spiral carbon magazine, with springs therein for forcing the carbons to the center of the same, an opening in line with such center through which the carbons are adapted to pass, spring arms for holding such carbons, means for feeding the same, and circuit wires connected to such spring arms, substantially as set forth.

2. In an electric arc lamp the combination of a casing, a spiral carbon magazine therein with springs for forcing the carbons to the inner end thereof, and an opening through the casing in line with such inner end through which the carbons are successively fed, spring arms connected with the casing for holding the carbons, to which the circuit wires are attached, a motor operating a drive chain, such chain having projections thereon working through the walls of the carbon magazine and thereby feeding the carbons, substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

FRED L. McGAHAN.

Witnesses:

JAMES P. BAKER,

M. G. McLAIN.