

No. 729,315.

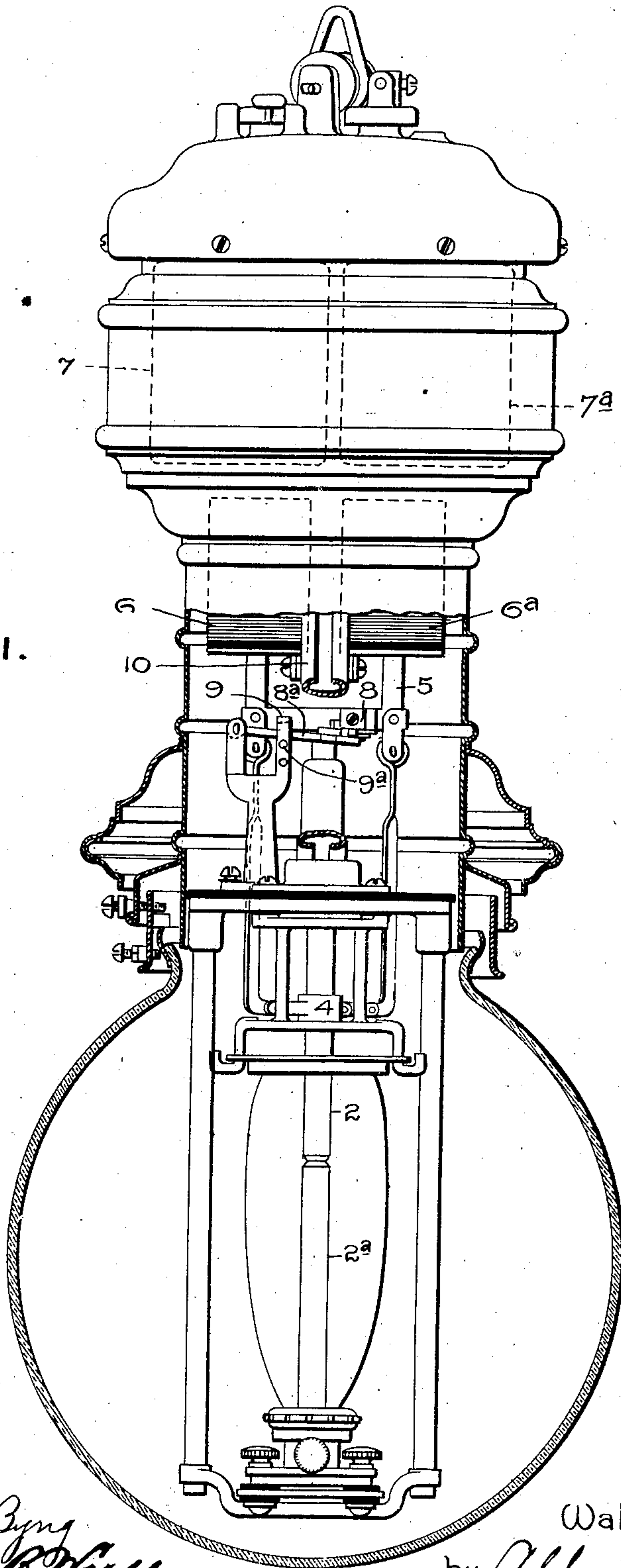
PATENTED MAY 26, 1903.

W. C. FISH.  
ELECTRIC ARC LIGHT.  
APPLICATION FILED JAN. 27, 1902.

NO MODEL.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

*Marcus H. Byng*  
*Benjamin B. Hill*

Inventor:

Walter C. Fish,

by *Albert G. Davis*  
Att'y

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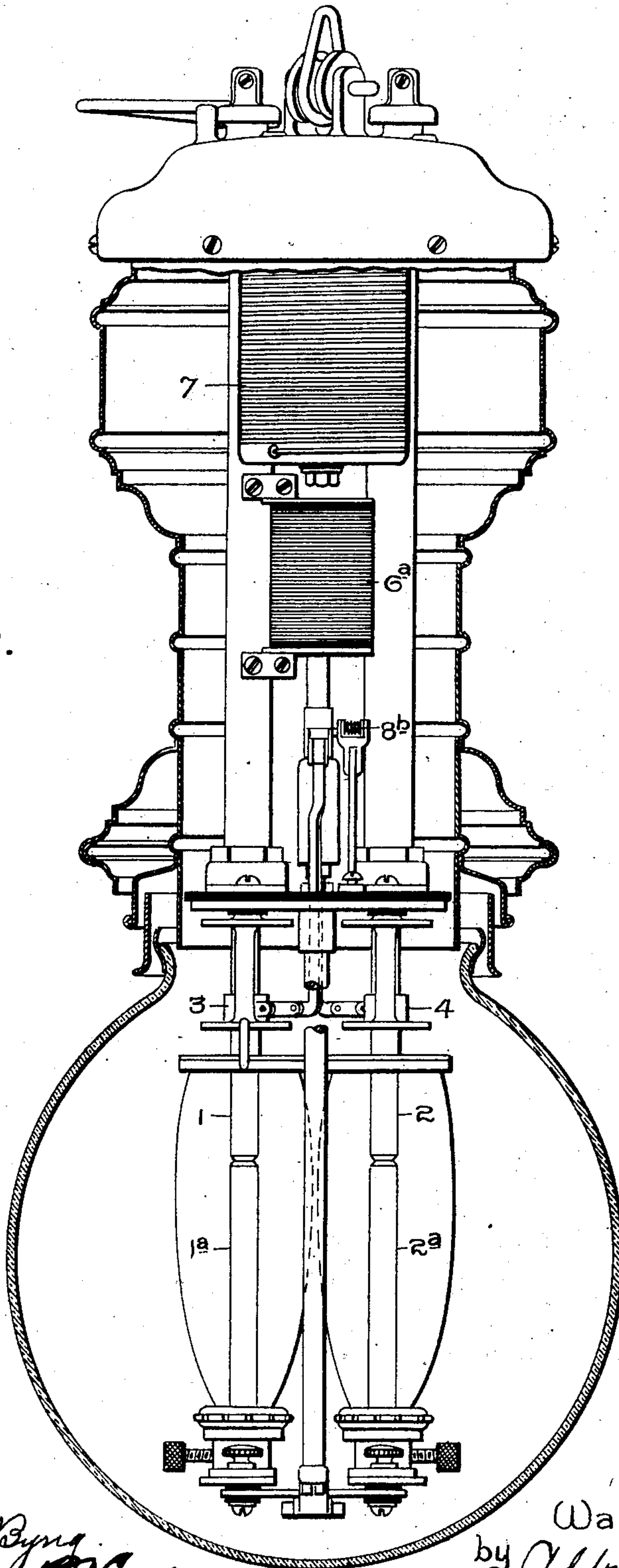
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3 SHEETS—SHEET 2.

Fig. 2.



Witnesses:

*Marcus H. Byng*  
*Benjamin B. Hull*

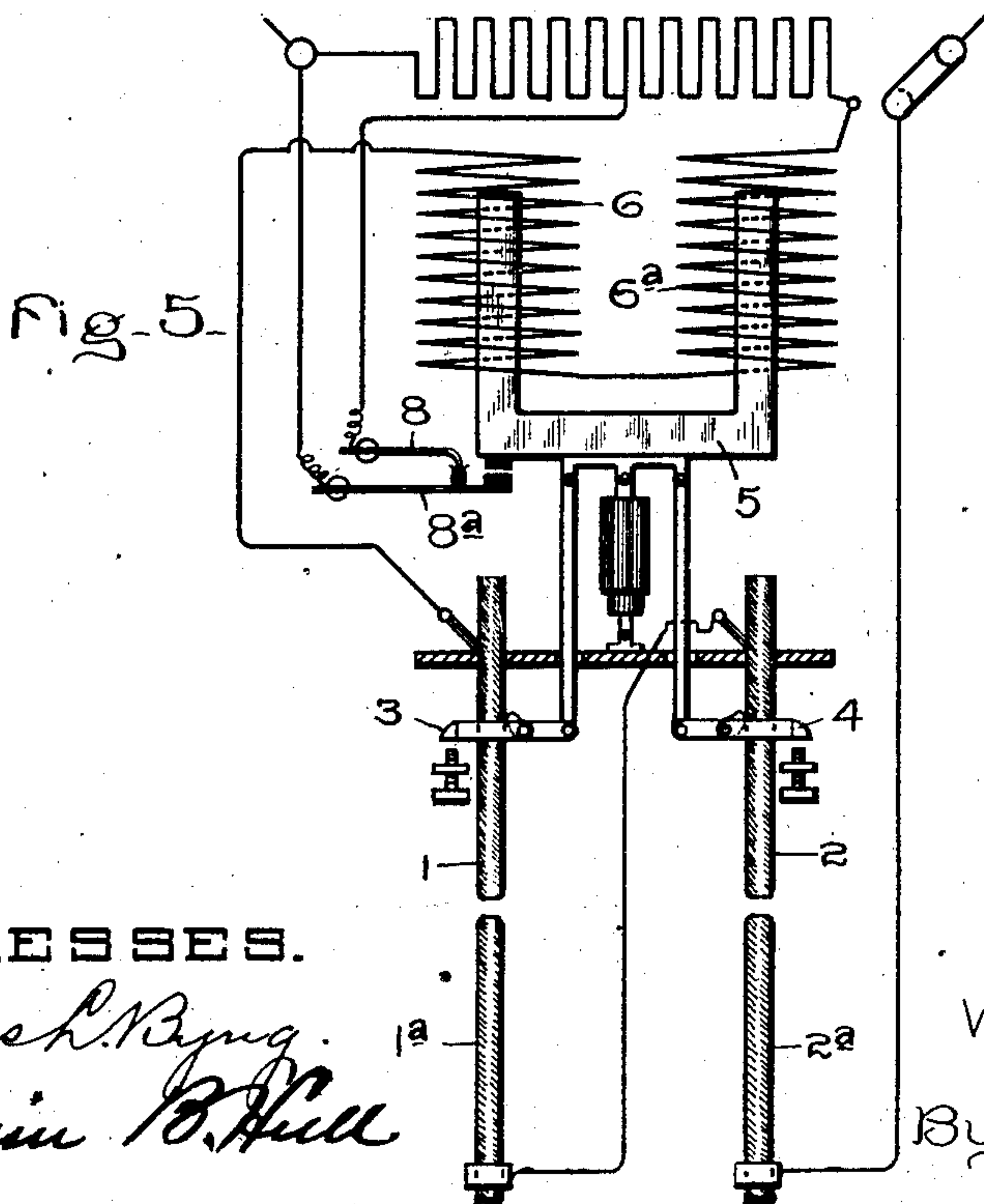
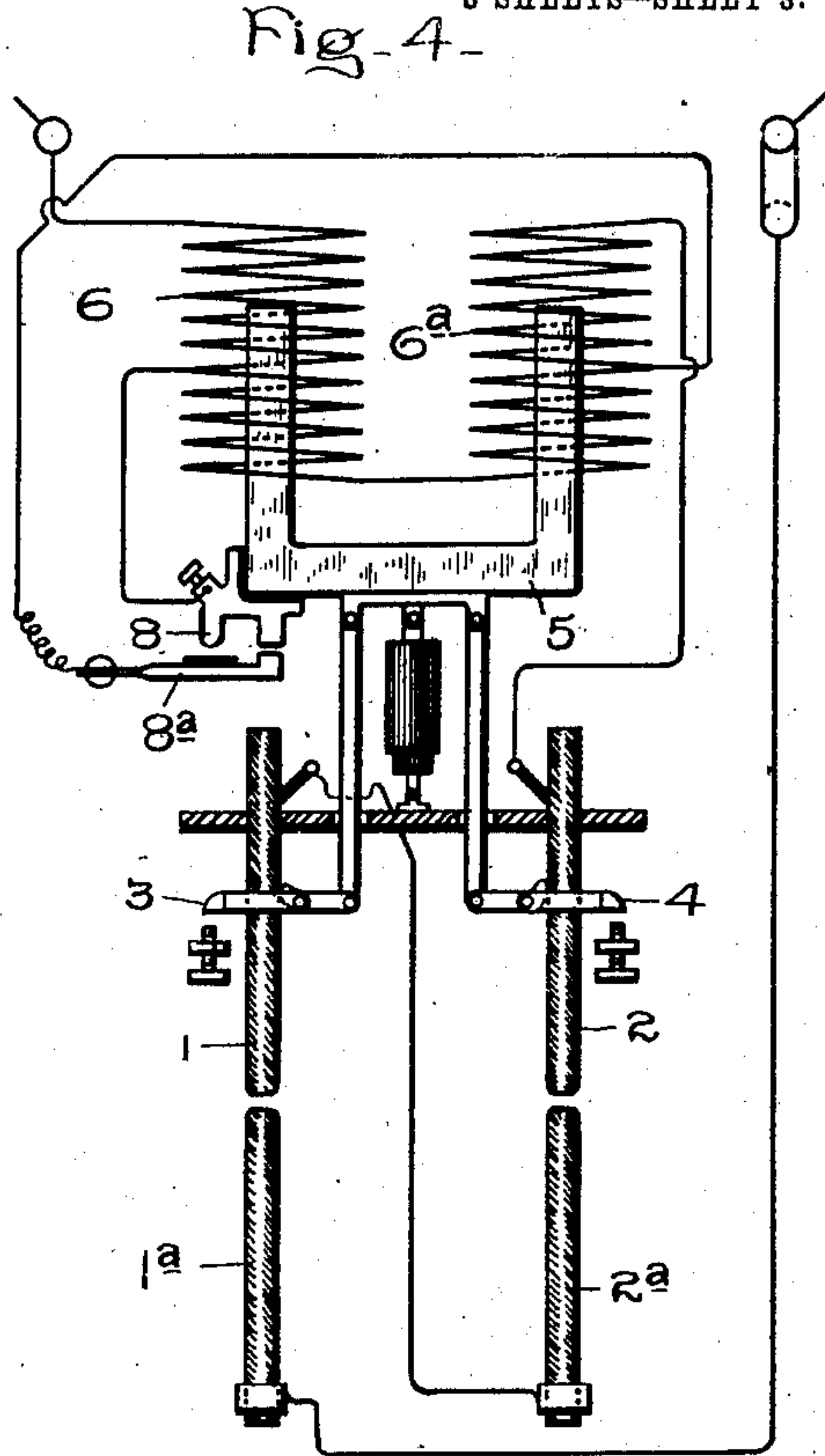
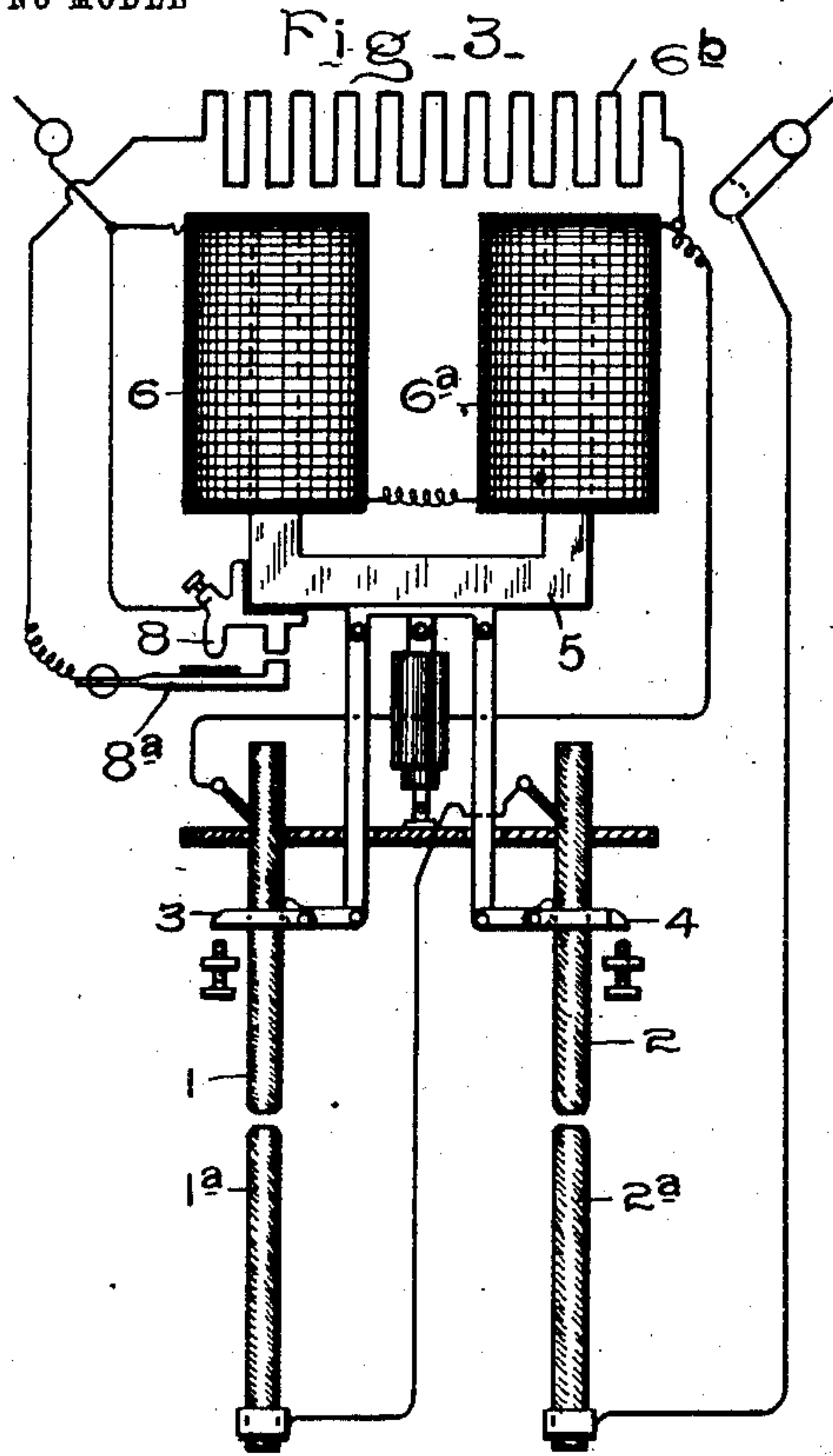
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NO MODEL

3 SHEETS—SHEET 3.



WITNESSES.  
Marcus R. Byng.  
Benjamin B. Hill

INVENTOR-  
Walter C. Fish,  
By Albert H. Davis  
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# UNITED STATES PATENT OFFICE.

WALTER C. FISH, OF LYNN, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## ELECTRIC-ARC LIGHT.

SPECIFICATION forming part of Letters Patent No. 729,315, dated May 26, 1903.

Application filed January 27, 1902. Serial No. 91,303. (No model.)

*To all whom it may concern:*

Be it known that I, WALTER C. FISH, a citizen of the United States, residing at Lynn, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Arc-Lamps, of which the following is a specification.

This invention relates to arc-lamps, the object being to provide a lamp suitable for constant-potential circuits of two hundred volts and upward. In lamps of this kind two or more pairs of carbons are arranged so as to maintain several arcs in series across the service-wires of the circuit, and in order to burn the several pairs of carbons evenly both or all positive carbons are caused to feed simultaneously.

My invention relates particularly to an improved feeding device. Thus, supposing two arcs are burning in series on a two-hundred-and-twenty-volt circuit, if no means are provided to effect feeding at fairly-regular intervals it may easily happen that before tripping one arc will have altogether too high a potential and the other will be correspondingly lowered.

In carrying out the invention I provide independent clutches for striking and regulating the several arcs and a common regulating-coil for all of the positive carbons. I provide means controlled by the position of the regulating-core or its attachments by which the lifting power of the regulating-coil is instantly materially reduced in value after the carbons have burned away sufficiently to require feeding. This may be effected by diverting all or part of the regulating-current from a portion or all of the regulating-coil, thereby cutting down the magnetizing value of the current and allowing the core instantly to settle, thus tripping both carbons and permitting both arcs to be struck afresh of the same length, or it may be effected in other ways, some of which will be hereinafter set forth.

The several features of my invention will be more particularly hereinafter described, and will be definitely indicated in the claims appended to this specification.

In the accompanying drawings, which illus-

trate the invention, Figure 1 is a side elevation, partly in section, of a twin arc-lamp embodying my improvements. Fig. 2 is a similar view on a plane at right angles to that indicated in Fig. 1, and Figs. 3, 4, and 5 are diagrammatic representations of different systems of feed-control embodying my improvements.

1 1<sup>a</sup> and 2 2<sup>a</sup> represent two pairs of carbons, the movable electrodes being controlled by independent clutches 3 4, controlled by a common regulating-core 5, governed by coils 6 6<sup>a</sup> and having its movement steadied by a dash-pot, as usual in arc-lamps. In lamps of this type it is found necessary to cause the several positive carbons to feed at the same instant. It is impossible to provide a carbon of such molecular purity and uniformity of texture that after the two arcs have been burning for a time they will be absolutely the same in length. It is therefore necessary to periodically re-strike the arcs at the same time, so as to render the action of the lamp uniform and enable the two sets of carbons to burn evenly. This has been done by simultaneously and mechanically tripping both movable electrodes. I accomplish the same result electrically, as by providing a contact 8, carried by the regulating-core or an attachment of the same and adapted to engage when the carbons have settled to the tripping-point a coöperative contact 8<sup>a</sup>, by which the power of the coil is weakened. In Fig. 3 a branch circuit for shunting a portion of the current from the regulating-coil is indicated to cause the lamp to feed. A desired amount of resistance 6<sup>b</sup> may be included in the branch circuit and the usual starting resistance in the lamp branch, as seen at 7 in Fig. 2. This results in an instantaneous weakening of the lifting power of the regulating-coil, permitting the core to instantly settle and tripping both or all clutches, allowing all of the carbons to feed. The increased current flowing when the carbons engage is sufficient to empower the coils to lift the core and strike all arcs afresh. Other ways of effecting the same result will easily occur to the skilled engineer. I have indicated several in Figs. 3, 4, and 5. In Fig. 4 part of each coil is cut out, and in Fig. 5



the resistance in the lamp-circuit is increased by opening a pair of normally closed contacts, which cuts in additional resistance.

An organized structure embodying my improvements is shown in Figs. 1 and 2, the steadying resistance being mounted near the top of the lamp. The short-circuiting contact is shown as mounted on a lever provided with a light retracting-spring  $8^b$ , and limiting-stops  $9$   $9^a$  for its upward-and-downward movement are provided. The contacts may be shod at the engaging-points with a tip of platinum or silver to prevent oxidation. Each clutch is provided with an independent tripping-floor, being, in fact, an attachment of the inner-globe cover. The arcs may be provided with independent inner inclosures or a common one, as desired. I have shown in the drawings a lamp provided with independent inner globes, each provided with a gas-cap and separate clamp at the bottom. These features may be of any desired or approved construction.

In operation current flows through the steadying resistance  $77^a$ , regulating-solenoid, to a clip on one positive carbon, passing by a flexible lead through a slot in the tubular backbone  $10$  of the lamp. Thence it passes through the two arcs in series and out to the negative terminal. After the carbons have burned away sufficiently to require tripping the core  $5$  will have settled, so as to bring into engagement contacts  $8$   $8^a$ , instantly effecting a material weakening in the power of the regulating-solenoid and permitting all movable carbons to feed.

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

1. An arc-lamp having a plurality of arcs connected in series, independent clutches for

the several movable carbons, a common regulating-magnet governing all arcs, and a branch circuit for materially weakening the power of the magnet at a determinate position of its core, whereby all carbons are fed simultaneously.

2. An arc-lamp for burning a plurality of arcs connected in series, provided with a plurality of movable carbons, each having an independent clutch, and a branch circuit for materially weakening the power of a common regulating-magnet governing all arcs at a determinate position of its core, whereby all clutches are simultaneously released.

3. An arc-lamp provided with a plurality of pairs of carbons connected in series, a common regulating-coil for all arcs, and a short circuit for part of said coil closed at a determinate position of the regulating-core, whereby all clutches are simultaneously actuated to feed the movable carbons.

4. An arc-lamp for burning a plurality of arcs in series, comprising a plurality of movable carbons, and a branch circuit for decreasing the power of the lifting magnetism thereby governing all arcs at a predetermined position of the regulating-core.

5. An arc-lamp for burning a plurality of arcs in series, comprising a plurality of movable carbons, a regulating-coil common to all, and a branch circuit for weakening its magnetism sufficiently to effect feeding when the regulating-core has settled to a predetermined point.

In witness whereof I have hereunto set my hand this 23d day of January, 1902.

WALTER C. FISH.

Witnesses:

DUGALD MCK. MCKILLOP,  
HENRY O. WESTENDARP.