(No Model.)

W. S. HAYS.

ELECTRIC ARC LAMP.

No. 463,720. Patented Nov. 24, 1891.

Fig. 1.

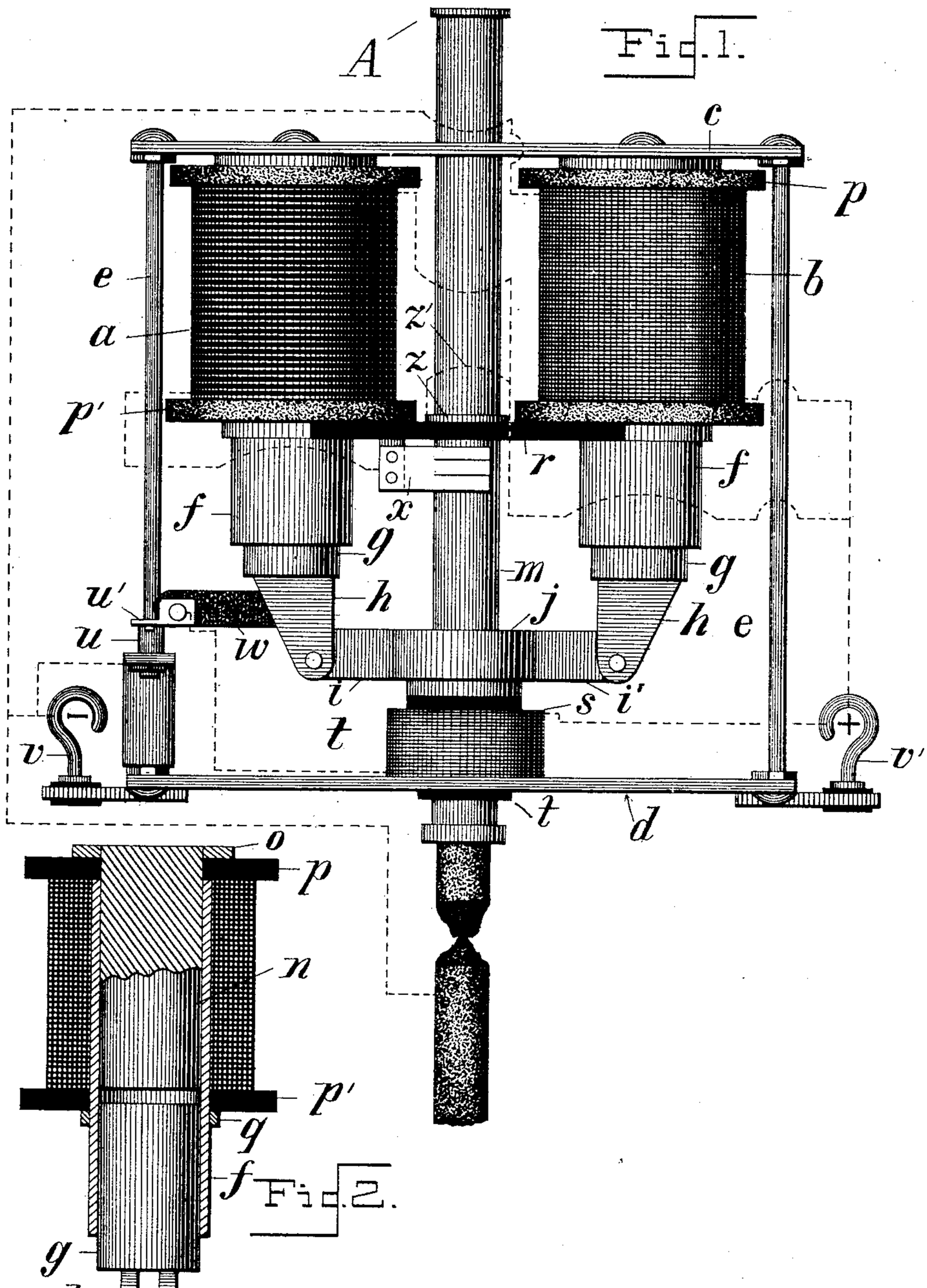

Fig. 2.

WITNESSES

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WILLIAM STAFFORD HAYS, OF TROY, OHIO.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 463,720, dated November 24, 1891.

Application filed July 27, 1891. Serial No. 400,873. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM STAFFORD HAYS, a citizen of the United States, and a resident of Troy, county of Miami, and State of Ohio, have invented certain new and useful Improvements in Arc Lamps, of which the following is a specification.

My invention relates to the mechanical construction of an electric-arc lamp.

The invention is described accurately by reference to the accompanying drawings, in which—

Figure 1 is an elevation of that part of the lamp to which the invention relates. Fig. 2 is a vertical section of a portion of the lamp.

The device embodying my invention consists of the combination of a main magnet *a* of coarse wire, a shunt-magnet *b* of fine wire, both securely attached to the upper plate *c*, which is connected to the lower plate *d* by posts *e*. Each magnet, as shown in Fig. 2, has a tubular non-magnetic axial projection *f*, in which loosely fits an axial cylindrical armature *g*, provided with a slotted extension *h*, to which is pivoted, respectively, the arms *i i'* of the ring-clutch *j*, through which passes the carbon-holder *m*. It will be noticed that the elements *f g h i* are in duplicate, the same being provided, respectively, for the magnets *a b*. The axes of the magnets *a b* are parallel to and equally distant from that of the carbon-rod holder *m*. The axes of the tubes *f* and armatures *g* coincide, respectively, with those of the magnets *a b*. The tubular projection *f* forms an extension to the tube *f'*, surrounding the core *n*. To this core is secured a washer *o*, against which presses the spool end *p*. The tube *f'* presses against the opposite side of the spool end or insulating-disk *p*, whereby the latter is held in a fixed position at one end of said core. The corresponding disk *p'* is held upon the tube *f'* by a ring *q*, soldered upon the same and pressing against the disk *p'*. Between the two disks is located a winding of a magnet. An insulating-plate *r* connects the disks *p'*, which belong, respectively, to the magnets *a b*. The holder *m* passes through said plate and also through the plates *c* and *d* and the high-resistance coil *s*, which is wound upon an insulating-tube *t*, surrounding the holder *m* and fixed to the plate *d*. Supported on said plate *d* is a contact *u*, which is in circuit with the lamp-terminal *v* and in path of the contact *u'*, which is carried upon an insulating-projection *w*, extending from one of the slotted extensions *h*. When the lamp is ready for use, the contacts *u* and *u'* touch each other, as do also the insulating-tube *t* and the ring *j*, while the cores *n* are at the maximum distance from the armature *g*.

With no current through the lamp or with carbon consumed the circuit is from the terminal *v'*, through the resistance-coil *s*, contacts *u u'*, and terminal *v*. With carbons in the lamp and with no current the circuit is the same, except that there is also a path from the lamp-terminal *v'*, through the magnet *a*, the brush *x*, which rests upon the holder *m*, through the carbons, and to the lamp-terminal *v*. If now the current passes through the lamp, it divides between the path of the carbons and the coil *s*, the two being branch circuits to each other. The magnet *a* being of low resistance and properly wound, the armature *h* is attracted sufficiently to interrupt the circuit at the contacts *u u'*. Then all the current will pass through the magnet *a*, raising its armature *g* to the full height and by means of a clutch *j* separating the carbons and starting the arc. As the arc lengthens more and more, current passes through the shunt-magnet *b*, attracting its armature *g* and raising the other side of the clutch *j* until the carbon-rod is released, which falls until the arc is the normal brilliancy, when the shunt-magnet *b* weakens, allowing its armature to drop, thus locking the rod *m* until the process is repeated through the formation of the lengthened arc.

z is a contact located upon plate *r* and electrically connected to post *v'* by the conductor *z'*. Therefore when the button A on top of the holder *m* touches the terminal *z*, (as it does when the carbons have been consumed,) the coil *a* is short-circuited, its core demagnetized, and armature *g* released. Contacts *u u'* close the circuit through the resistance-coil *s*.

I find in practice that the lamp is free from the difficulty known as the "rod sticking."

I claim as my invention—

1. In an electric-arc lamp, the combination of a carbon-holder *m*, a friction-ring clutch *j*, surrounding the same and having oppositely-

located arms *i i'*, main and shunt magnets *a b*, whose axes are parallel to and substantially equally distant from that of the holder *m*, tubular axial extensions *f*, of non-magnetic material, projecting from said magnets and forming extensions to the tubes *f'*, upon which the magnet-coils are wound and within which are located the magnet-cores *n*, cylindrical armatures *g*, loosely and axially located in said tubes *f* and having slotted extensions *h*, which are pivoted to the said arms *i i'*, respectively, and an insulating-tube *t*, surrounding the holder *m* and supporting the ring *j*.

2. In an electric-arc lamp, the combination of a carbon-holder *m*, a friction-clutch *j*, surrounding the same and having oppositely-located arms *i i'*, main and shunt magnets *a b*, whose axes are parallel to and substantially equally distant from that of the holder *m*, tubular axial extensions *f*, of non-magnetic material, projecting from said magnet and forming extensions to the tubes *f'*, upon which the magnet-coils are wound and within which are located the magnet-cores *n*, cylindrical armatures *g*, loosely and axially located in said tubes *f* and having slotted extensions *h*, which are pivoted to the said arms *i i'*, respectively, an insulating-tube *t*, surrounding the holder *m* and supporting the ring *j*, a resistance-coil *s*, mounted upon the insulated tube *t* and in circuit with separable contacts *u u'*, one of which is stationary and the other carried by one of the extensions *h*, and an insulating-plate *r*, connecting the magnet *a b* and carrying an electric terminal *z*, connected with one of the terminals of the lamp and carrying a brush *x*, which is electrically connected with the carbon-holder *m* and with the coil of magnet *a*.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 21st day of July, 1891.

WILLIAM STAFFORD HAYS.

Witnesses:
W. W. EDGE,
J. A. DAVY.