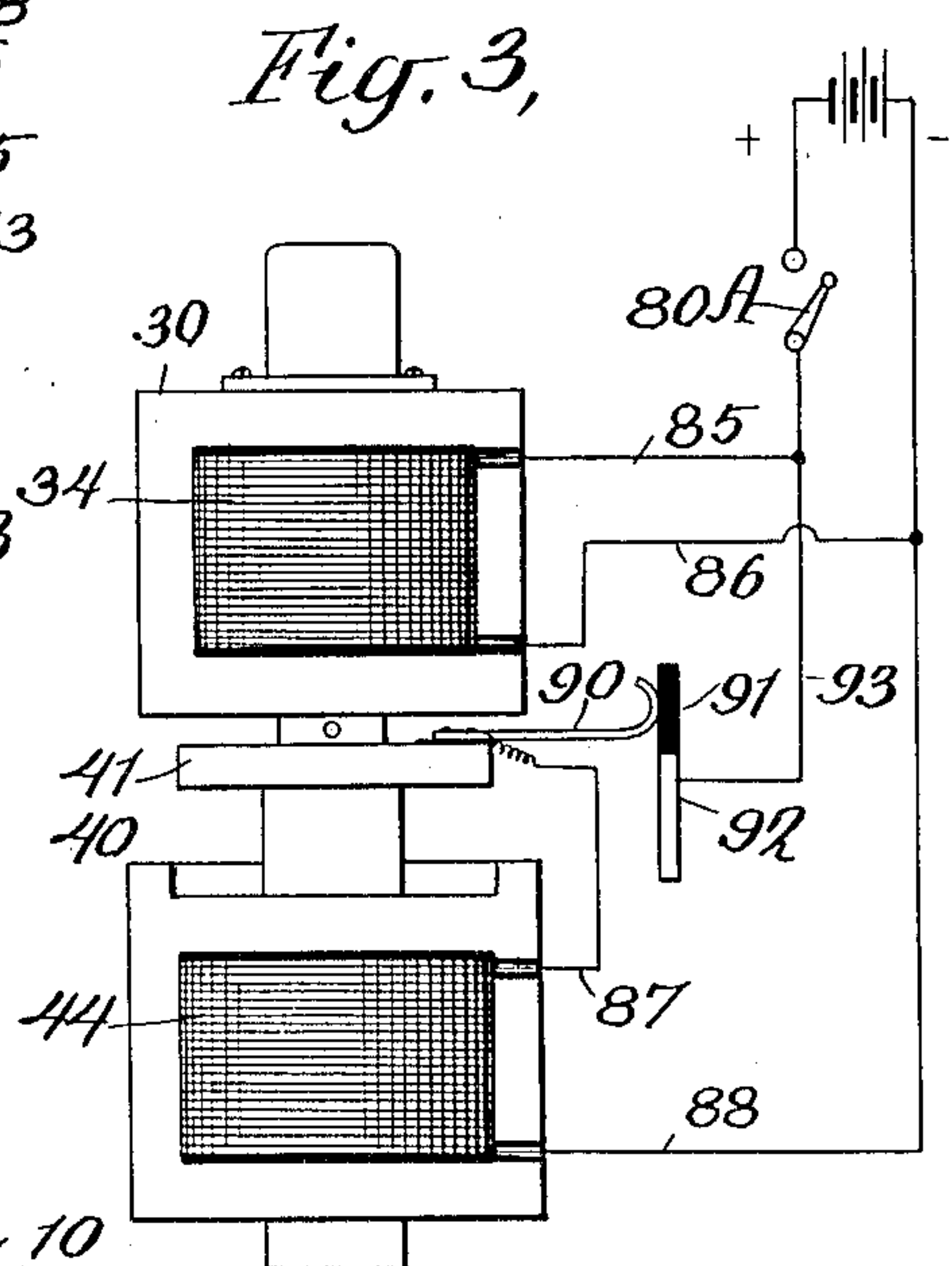
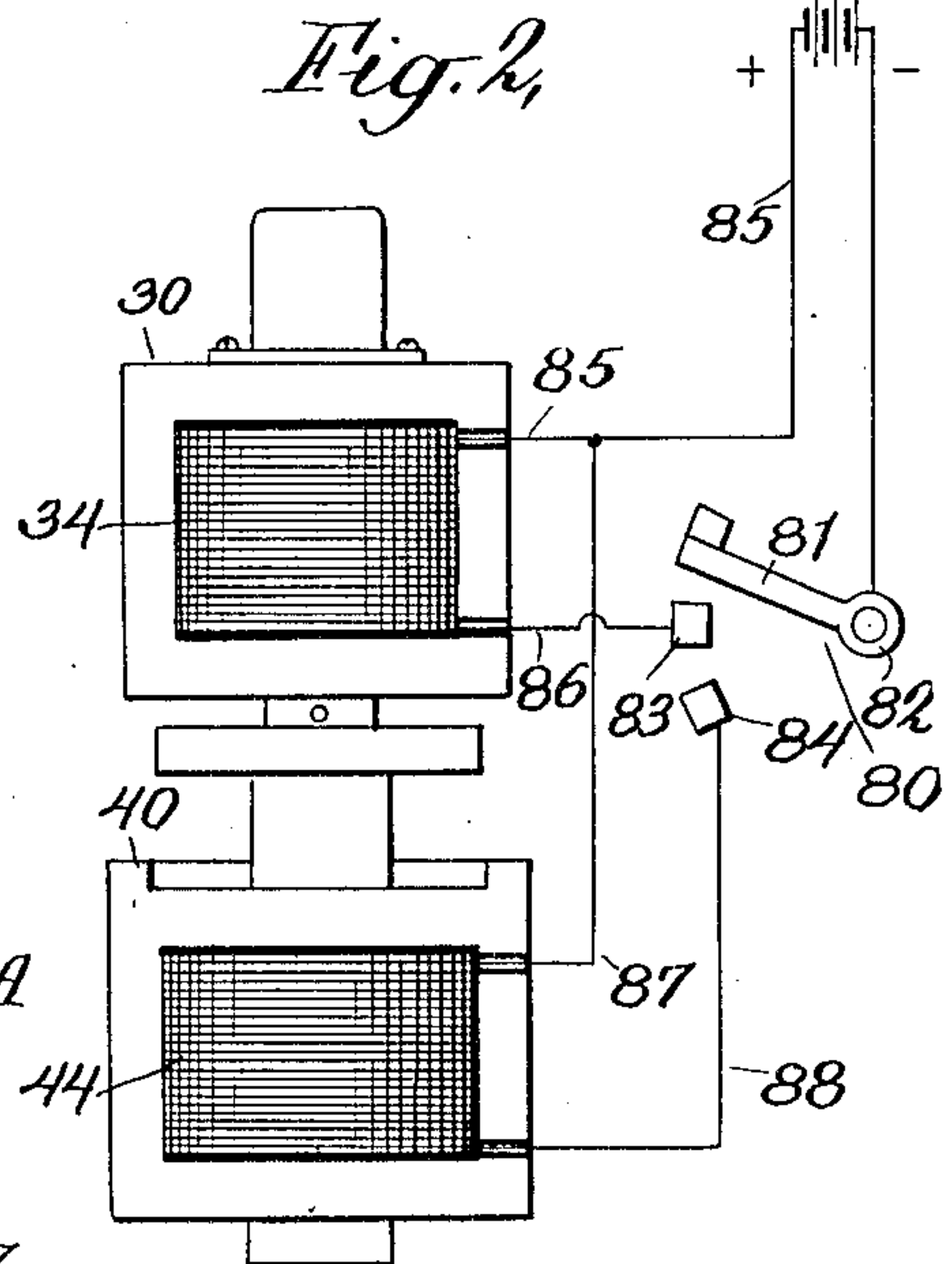
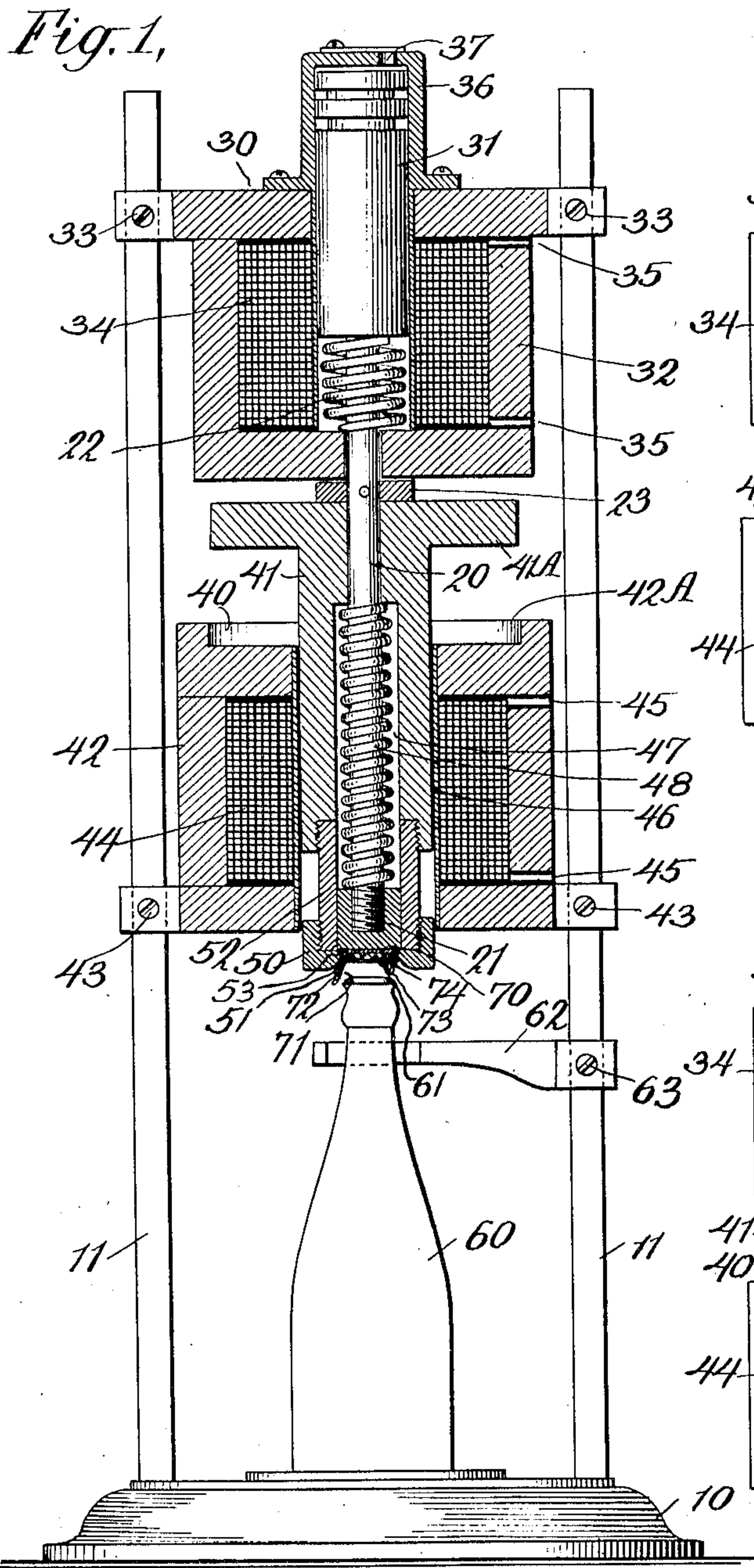


No. 871,998.

PATENTED NOV. 26, 1907.

G. KIRKEGAARD.
BOTTLE CAPPING MACHINE.
APPLICATION FILED JUNE 13, 1906.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 4,

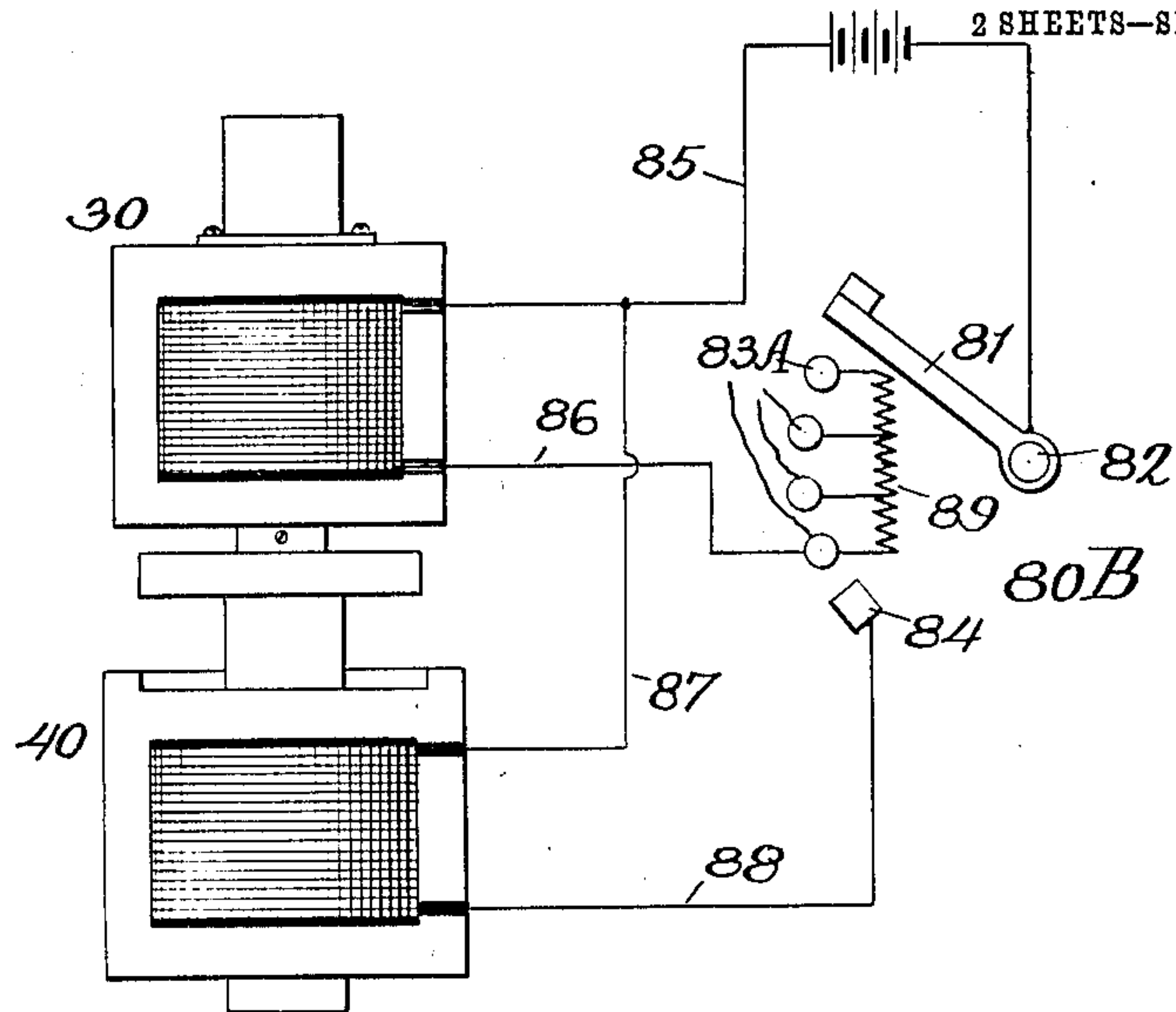
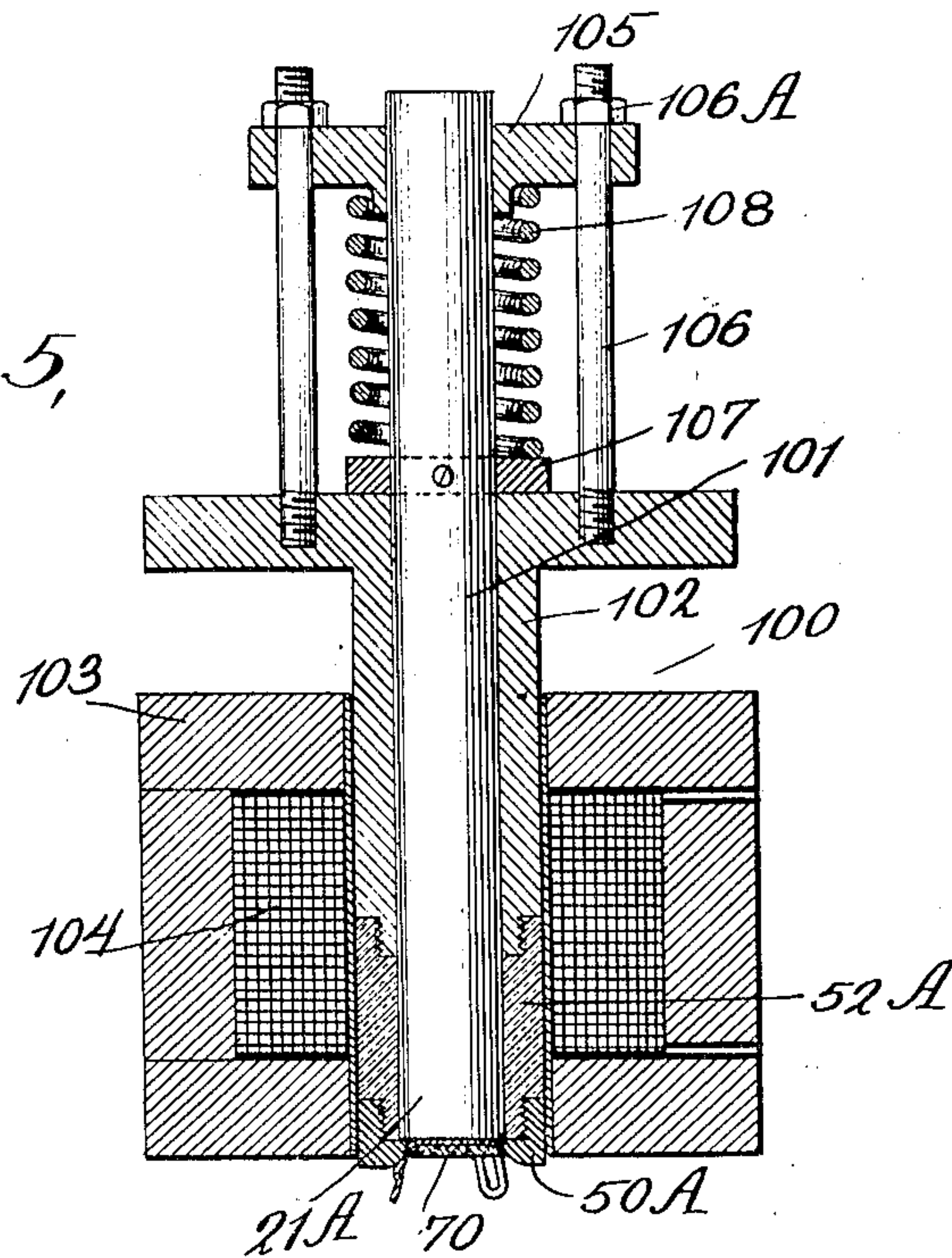


Fig. 5,



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UNITED STATES PATENT OFFICE.

GEORG KIRKEGAARD, OF NEW YORK, N. Y.

BOTTLE-CAPPING MACHINE.

No. 871,998.

Specification of Letters Patent.

Patented Nov. 26, 1907.

Application filed June 13 1906. Serial No. 321,432.

To all whom it may concern:

Be it known that I, GEORG KIRKEGAARD, a citizen of the United States, and a resident of the city of New York, in the county of New York and State of New York, United States of America, have invented certain new and useful Improvements in Bottle-Capping Machines, of which the following is a specification.

My invention relates to a bottle capping machine and its object is to provide a simple device for securing bottle stoppers or caps over the mouths of bottles by means of an electrically actuated apparatus.

I will describe my invention in the following specification and point out its novel features in claims.

Referring to the drawings, Figure 1 is a front elevation, partly in section, of my improved bottle capping machine. Fig. 2 is a diagram of electrical circuits used in carrying out my invention. Fig. 3 is a diagram showing a modification of the electrical circuits. Fig. 4 is a diagram of another arrangement for the electrical circuits. Fig. 5 shows a modification in which a magnet having a single winding is used of my invention.

Like characters of reference designate corresponding parts in all of the figures.

10 designates a base upon which the various parts of my apparatus are mounted. 11, 11 are standards securely attached to this base.

20 designates a vertically movable shaft. To the end of this shaft a plunger-head 21 is attached. This plunger-head may be constructed of hardened steel and permanently magnetized if desired; or it may be magnetized by the current flowing through magnet-spools 34 and 44.

22 is a spring which is arranged to support the shaft 20 and its connected parts as will be pointed out later.

23 designates a collar which is attached to the shaft 20.

30 designates an electromagnet. 31 is the core of this magnet and 32 is the magnet-frame. This frame may be supported by the standards 11, 11, to which it may be secured by means of screws 33, 33. 34 designates a winding for this magnet.

35, 35 are insulated bushings which extend through the magnet-frame for the passage of the terminals of the magnet winding.

36 is a bushing of brass or other non-

magnetic material which extends through the winding 34, and the upper part of which extends up and over the core 31. The upper portion of this bushing is arranged to form a dash-pot for controlling the movement of the core 31, and is provided at its top with a valve 37 which is arranged to allow air within the bushing to escape from and prevent its entering the space between the bushing and the core 31.

40 designates a second electromagnet. 41 is the core of this magnet which may be constructed, as shown, with a projecting shoulder 41^A.

42 is the frame for the magnet 40. This frame 42 may be constructed, if desired, with a recess 42^A with which the shoulder 41^A of the core 41 co-acts. This frame 42 may be supported by the standards 11, 11, to which they may be secured by means of the screws 43, 43. 44 designates a winding for this magnet 40.

45, 45 are insulated bushings through the magnet-frame 42 for the terminals of winding 44.

46 is a bushing of brass or other suitable material in the magnet-frame 42 within which the core 41 is arranged to move. A portion of the core 41 is drilled out, as shown at 47, for the reception of a spring 48, the upper end of which rests upon the shoulder at the top of this recess 47, and the lower end of which rests upon the plunger-head 21.

50 designates a forming-ring which is provided with a forming-surface 51 and which may be attached to the core 41 by means of a threaded bushing 52 of brass or other non-magnetic material. The inner portion of this forming-ring 50 preferably projects inside of the bushing 52, as shown at 53, for the purpose of supporting the plunger-head 21.

60 designates a bottle which is provided near its upper end with an annular rim or shoulder 61.

62 is a guide for the bottle which may be attached to one of the standards 11 by means of a screw 63.

70 designates a cap which is adapted to fit over the top of the neck of the bottle 60. This cap 70 is provided with depending fingers 71 which are arranged with projecting portions 72 upon which the forming-ring 50 acts, as will appear later.

73 designates a packing of cork or other resilient material which may be placed within

the cap 70 before the cap is placed upon the bottle. These caps are preferably constructed of magnetic material such, for example, as commercial tin, which is sheet-iron coated with metallic tin.

The bottle 60 may be placed upon the base 10 and held in alinement with the center of the cores 31 and 41 by means of the guide 62. The metallic cap, which is to be secured to this bottle, may then be placed upon the plunger-head 21. As the plunger-head 21 is magnetized it will cause the cap to be held in this position during the operation of the apparatus.

80 designates a manually operated switch which comprises a lever 81, which is pivoted at 82, and which is adapted to be moved onto stationary contacts 83 and 84.

+ and - designate the mains from a suitable source of electrical supply. Referring to Fig. 2, the positive main is connected by means of conductors 85 and 87 to the upper terminal of the magnet windings 34 and 44. The lower terminals of magnet windings 34 and 44 are connected, respectively, by conductors 86 and 88 to stationary contacts 83 and 84.

Now, when an operator moves the lever 81 until it touches stationary contact 83, a circuit will be closed thereby from the positive main through magnet winding 34 and switch 80 to the negative main. The magnet 30 will thereby be energized and will pull its core 31 downward at a speed dependent upon the action of the dash-pot at the top of the core. This action will cause the plunger-head 21 and the cap 70 to be moved downward until the cap is brought in contact with the top of the bottle 60. As the core 41 and its connected parts are connected to the core 31 by means of the rod 20, the spring 48 and the collar 23, the core 41 and the forming-ring 50 will be moved down together with the plunger-head 21 by the electromagnet 30. The cap 70 will thus be firmly pressed down upon the top of the bottle 60, and its resilient packing will be compressed by a pressure dependent upon the strength of the magnet 30 and the action of the retractile spring 22. A further movement of lever 81 of the switch 80 will cause this lever 81 to touch the stationary contact 84 and to thereby close a second circuit from the positive main through magnet winding 44 and switch 80 back to the negative main. The electromagnet 40 will thereby be energized and will attract its core 41 and cause the latter and its connected parts to be moved downward against the action of the spring 48. This will cause the forming-ring 50 to be moved down past the top of the bottle over the depending fingers 71 of the cap 70, and the forming surfaces 51 of the forming-ring, acting upon the projecting portions 72 of the depending fingers, will cause the latter to be

pressed in under the shoulder 61 on the top of the bottle. This will cause the cap to be securely fastened to the bottle and it will remain in this position when the operator opens the switch 81 and thereby allows the magnets 30 and 40 to become deenergized, and the springs 33 and 48 to raise the parts back again to their original position. The dash-pot will not retard the upward movement of the parts as the valve 37 will open and allow the air to pass freely out of the space above the core 31 within the bushing 36.

The dash-pot is provided to retard the downward movement of the plunger 21 so that it will not break the bottle. If desired, the arrangement shown in Fig. 4 may be used, in which case the switch 80^B is provided with pivoted lever 81 and stationary contact 84; but instead of contact 83, a plurality of contacts 83^A are provided, connected together by a resistance 89. With this arrangement the current can be turned onto magnet 30 gradually as the lever 81 is moved over contacts 83^A.

In the modification of wiring shown in Fig. 3 a single switch 80^A is provided. When this is closed a circuit will be completed from the positive main, through switch 80^A, conductor 85, magnet winding 34 and conductor 86 back to the negative main. Magnet 30 will thereby be energized and the operation will be similar to that previously described. In this case, however, the upper terminal 87 from the magnet winding 44 is connected to a brush 90 which is mounted upon but insulated from the core 41. This brush 90 rests upon an insulating strip 91, but as the core 41 is moved downward by the action of magnet 30, this brush 90 will be moved down to a conducting strip 92 which is connected by the conductor 93 through the switch 80^A to the positive main. The lower terminal 88 of magnet winding 44 is in this case connected directly to the negative main so that this movement of the brush 90 will automatically close a circuit through magnet winding 44 and cause the magnet 40 to perform its part of the operation.

Referring now to Fig. 5, I have shown a simple form of my invention, in which case but one magnet is used. This magnet is designated by 100, and it comprises an inner core 101 and an outer core 102, a magnet frame 103 and a magnet winding 104. A ring 105 is connected to the top of the core 102 by means of rods 106, 106. 107 designates a collar securely attached to the core 101, and 108 designates a compression spring which surrounds the core 101. The bottom of this spring rests upon the collar 107, and the top of the spring rests upon the ring 105. The compression of this spring may be regulated by means of nuts 106^A, 106^A upon the rods 106, 106.

The bottom of the core 101 forms the plun-

ger-head 21^A. A forming-ring 50^A is connected to the outer core 102 by means of a threaded bushing 52^A, preferably of brass.

When an electric current is sent through the winding 104 the magnet 100 will become energized thereby and will cause the cores 101 and 102 to be pulled downward. The movement of the inner core 101 will be arrested when the cap 70 comes in contact with the top of the bottle, but the magnet will continue to attract its cores and will cause the core 102 to be moved down against the action of the spring 108 until the forming-ring 50^A has passed down over the depending fingers of the cap and has secured it to the bottle in the manner previously described.

I have shown and described several modifications of my bottle capping machine actuated by means of electromagnets. I believe this invention is broadly new and that many other modifications may be made of it without departing from the spirit of the invention.

What I claim is.—

1. A bottle capping machine comprising a plunger, a forming-ring having its axis in alinement with the axis of the plunger, and an electromagnet arranged to actuate said plunger and ring.

2. A bottle capping machine comprising a plunger, a forming-ring having its axis in alinement with the axis of the plunger, an electromagnet arranged to actuate said plunger and ring, and means for regulating the action of the electromagnet.

3. A bottle capping machine comprising a magnetized plunger arranged to support a cap of magnetic material, a forming-ring, and an electromagnet arranged to actuate said plunger and ring.

4. A bottle capping machine comprising two movable members, electromagnetic means arranged to move said members together until the movement of one of said members is arrested, and to impart a further movement to the other member.

5. In a bottle capping machine, the combination of a plunger, a forming-ring associated therewith, an electromagnet arranged to move the plunger and the ring together, until the movement of the plunger is arrested, and a second electromagnet arranged to impart a further movement to the forming-ring.

6. In a bottle capping machine, the combination of a plunger, a forming-ring asso-

ciated therewith, an electromagnet arranged to move the plunger and the ring together, a dash-pot arranged to control said movement, and a second electromagnet arranged to impart a further movement to the forming-ring.

7. In a bottle capping machine, the combination of a movable member arranged to secure a cap of magnetic material to a bottle, and electromagnetic means for supporting the cap and for actuating the movable member.

8. The combination of a plunger arranged to support a cap of magnetic material and to press said cap over the mouth of a bottle, an electromagnet for magnetizing and actuating the plunger, a forming-ring arranged to secure the cap to the bottle, and a second electromagnet for actuating the forming-ring.

9. In a bottle capping machine, the combination of a plunger, a forming-ring associated therewith, an electromagnet arranged to move the plunger and the ring together, until the movement of the plunger is arrested, a second electromagnet arranged to impart a further movement to the forming-ring, circuits for said magnets and means for closing said circuits.

10. In a bottle capping machine, the combination of a plunger, a forming-ring associated therewith, an electromagnet arranged to move the plunger and the ring together, until the movement of the plunger is arrested, a second electromagnet arranged to impart a further movement to the forming-ring, circuits for said magnets, a manually operated switch arranged to close the circuit through said first magnet, and an automatic switch actuated by the movement produced by said first magnet for closing the circuit through the second magnet.

11. The combination of a frame, a magnetized plunger arranged to hold a bottle cap of magnetic material and to press said cap over the mouth of a bottle, an electromagnet for actuating the plunger, a forming-ring arranged to secure the cap to the bottle, and a second electromagnet for actuating the forming-ring, said electromagnets being adjustably supported by said frame.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORG KIRKEGAARD.

Witnesses:

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ERNEST W. MARSHALL.