

943,931.

2 SHEETS—SHEET 1.



Edward J. Brown

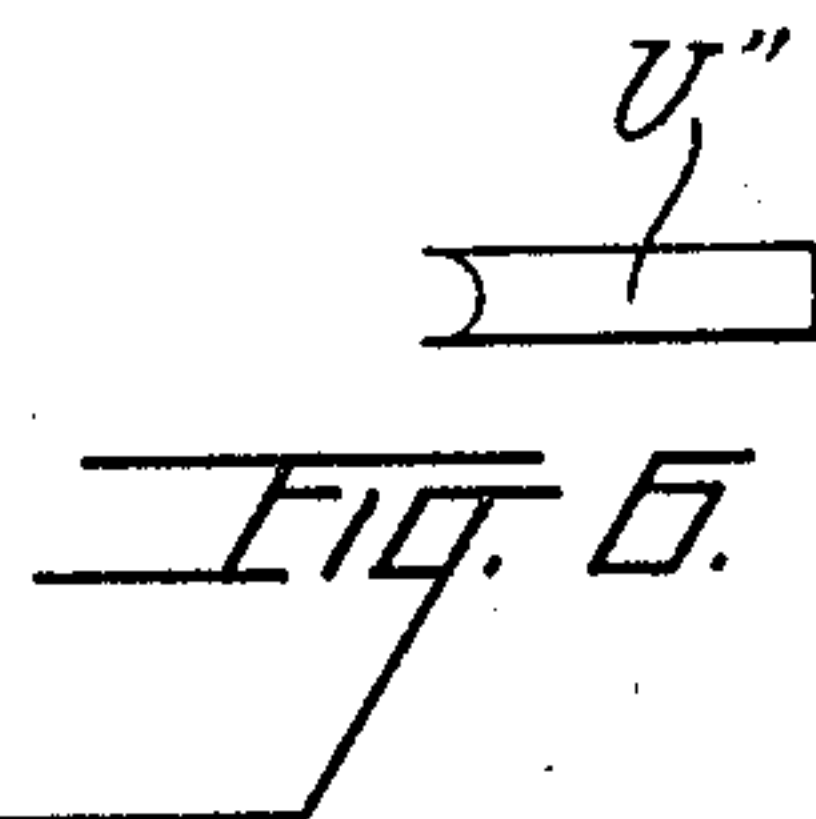
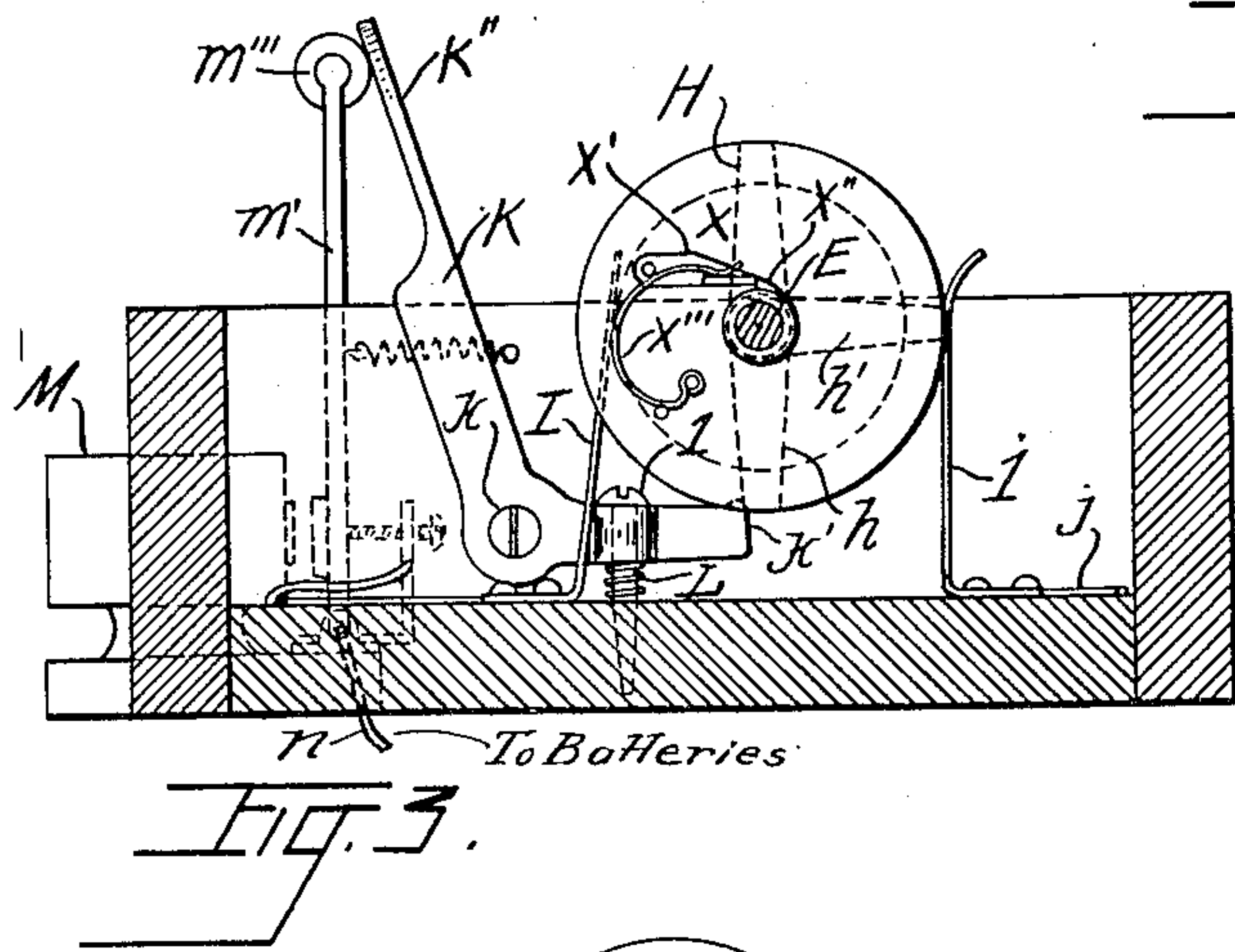
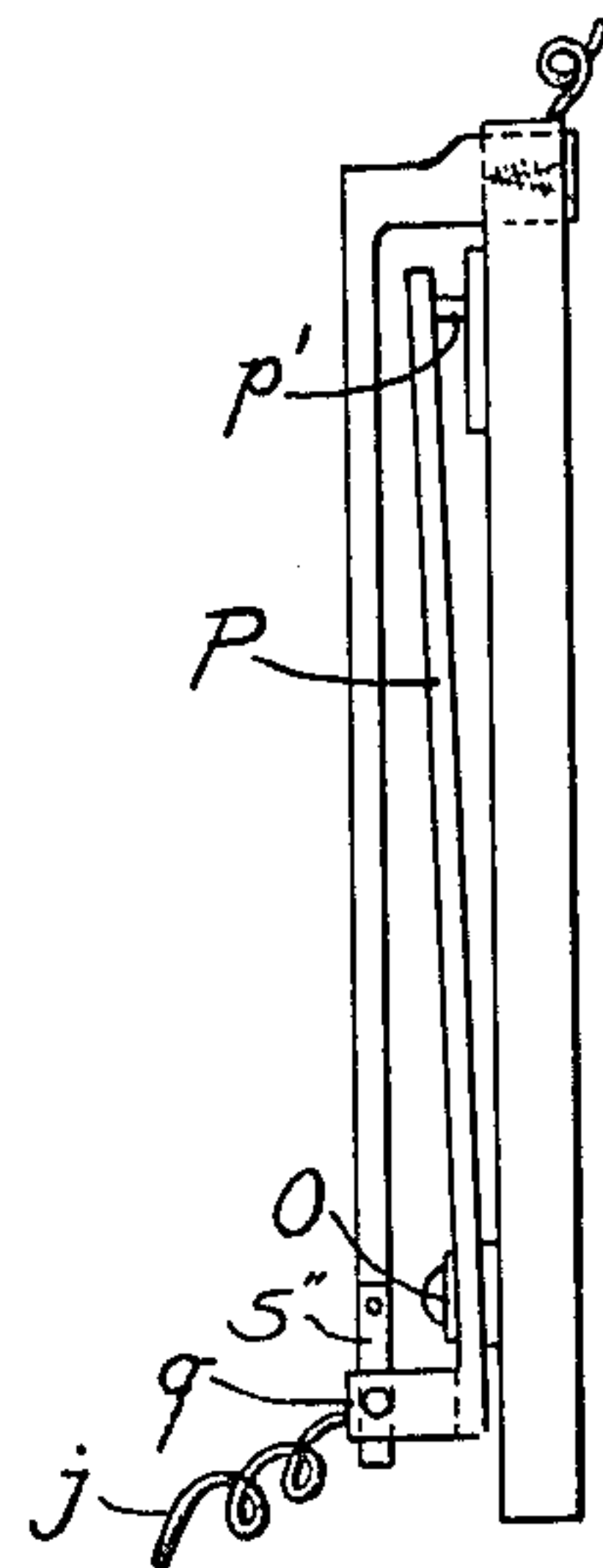
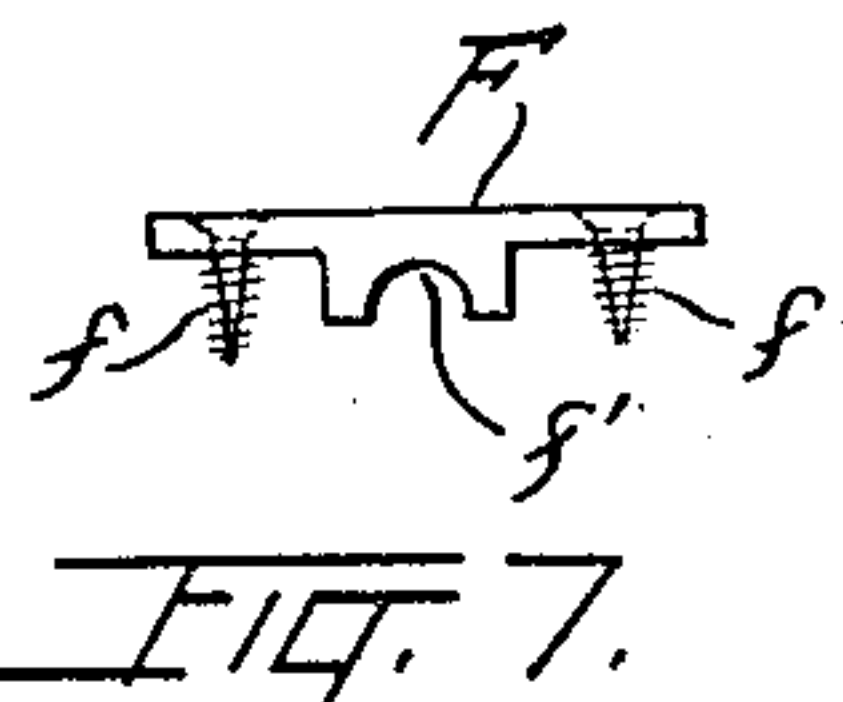
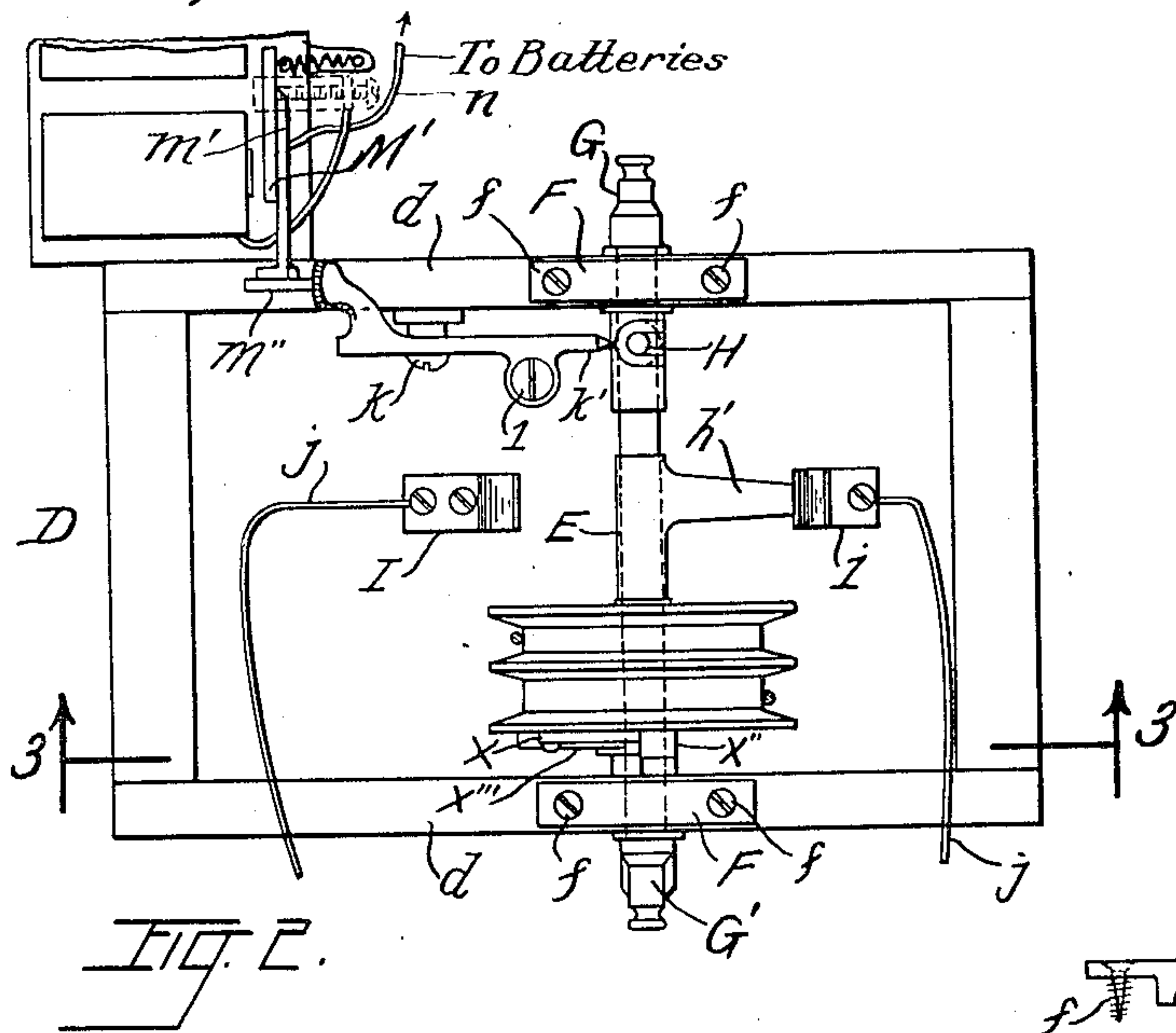
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DAMPER REGULATOR.
APPLICATION FILED NOV. 9, 1908.

Patented Dec. 21, 1909.

2 SHEETS—SHEET 2.

943,931.



WITNESSES:
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UNITED STATES PATENT OFFICE.

FREDRICK C. GUPTILL, OF ELGIN, ILLINOIS, ASSIGNOR OF ONE-HALF TO WILLIAM F. LYNCH, OF ELGIN, ILLINOIS.

DAMPER-REGULATOR.

943,931.

Specification of Letters Patent.

Patented Dec. 21, 1909.

Application filed November 9, 1908. Serial No. 461,681.

To all whom it may concern:

Be it known that I, FREDRICK C. GUPTILL, a citizen of the United States, and a resident of Elgin, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Damper-Regulators, of which the following, when taken in connection with the drawings accompanying and forming a part hereof, is a full and complete description, sufficient to enable those skilled in the art to which it pertains to understand, make, and use the same.

This invention relates to thermostatically actuated automatic damper regulators for controlling the combustion in furnaces, steam generators and hot water boilers respectively.

The object of this invention is to obtain a damper regulator which will be economical in construction, not liable to get out of order and durable.

A further object of this invention is to obtain a device which will be simple, easily installed and readily understood and operated by persons not particularly skilled in the care and operation of machinery or electrical devices.

In the drawings referred to Figure 1 is a view showing a device embodying my invention installed, the thermostatic member of the device being shown in elevation on a much larger scale than the motor, the motor of the device being shown in cross section and the furnace, the dampers whereof are actuated by the device embodying my invention being shown in side elevation on a much smaller scale than the motor of the device. Fig. 2 is a top plan view of the motor of the device. Fig. 3 is a vertical section of the motor on line 3—3 of Fig. 2, viewed in the direction indicated by the arrows. Fig. 4 is a side elevation of the thermostatic member of the device. Fig. 5 is a side elevation of the pulleys which are loosely mounted on the shafts of the motor. Fig. 6 is a side elevation of an element forming a part of the pulleys illustrated in Fig. 5. Fig. 7 is a side elevation of a bearing plate forming an element of the device embodying this invention.

A reference letter applied to designate a given part is used to indicate such part throughout the several figures of the drawings wherever the same appears.

A is a furnace.

B is a damper controlling the admission of air to the fire box of the furnace, and C

is a damper controlling the admission of air to the smoke pipes of the furnace, that is, the pipes through which the products of combustion are discharged from the furnace.

D is a box preferably of wood in which the operating parts of the motor are mounted, such box forming the base and frame of the motor.

E is a shaft rotatably mounted in the sides d, d , of box D. e, e' , are, respectively, cranks on shaft E, which I construct integral with such shaft.

F, F, are, respectively, metal plates which are secured to the top face of the sides d, d , to form a part of the bearings of shaft E. When the device is in operative condition an upward thrust or lifting of the shaft occurs and such shaft is thereby forced against the under faces f' of plates F, F, respectively.

G is the thermostatic member of the device.

H, h, h' , respectively, are arms extending radially outward from shaft E and I construct such arms integral with such shaft.

I, i, i , are springs forming electric terminals to wires J, j, j , respectively. The terminals I, i, i , are so constructed that the parts thereof with which the arm h' is alternately brought into electrical contact in the operation of the device are yieldingly held in position to press against such arm h' as such arm is forced against them.

K is a latch pivotally mounted in screw k arranged so that the lower end j' thereof is yieldingly held by spring L in the path of movement of the respective arms H, h, h' , when such arms are turned by the rotation of the shaft E and l is a screw adjusted to limit the movement of latch K.

M is an electromagnet.

m is a wire attached to one of the plates F and to one end of the coil of electromagnet M.

M' is the armature of electromagnet M. Armature M' is mounted on lever or arm m' and arranged so that, as the armature is brought toward the magnet upon the magnetic excitation thereof when an electric current is traversing its coils, the circuit of which the coils form elements is thereby broken; and the vibration of such lever or arm is thus obtained in the usual way of actuating electric call and door bells.

m'' is a hammer on the upper end of lever or arm m' , arranged to strike the end k'' of

latch K and force end h' of said latch out of engagement with the one of levers H, h , which is in contact therewith.

N, N, are batteries of the device.

5 O is a pivot secured on the base of the thermostatic member G and P is a lever pivotally mounted on pivot O. The lever P is provided with the spring end p having pin p' thereon and with the forked end p'' carrying terminals Q, q . The wire J, which is attached at one end to spring terminal I is attached to terminal Q and wire j one end of which is attached to spring terminal i is attached to terminal q .

15 R is a gage, provided with holes r, r , into which pin p' fits.

S is a thermostatic member consisting of a strip of metal and a strip of hard rubber riveted together and mounted on the base of the thermostatic member with one end thereof secured to such base, as by screw S' and arranged so that the other and free end thereof is between terminals Q, q . Variations in temperature cause movement of the free end of the thermostatic member S to alternately bring springs S'', S'' , on such end into electrical contact with terminals Q, q .

20 S'', S'' , are springs of electrical conducting material arranged to permit additional movement of the thermostatic member S after electrical contact with the respective terminals Q, q , is made.

The several holes or recesses r, r , are marked with a number corresponding with the degrees of temperature required (when pin p' is in a given one of such holes) to cause electrical contact of the lower end of the thermostatic member S with terminal Q.

40 Wire m is attached to one of the plates F and to one end of the coil of electromagnet M and wire n is attached to the other end of such coil and to one pole of one of the batteries N. The batteries are joined in series and the last one of the series is connected to the metal strip of thermostatic member S, to be in electrical communication therewith.

45 U, U' , are wheels mounted on shaft E to turn therewith. To permit the making of the shaft E of cast metal with arms e, e' , H, h , and h' , respectively, integral therewith, I have cut out portion U'' of wheels U, U' , placed the wheels on the shaft and then returned such part U'' to its place in the wheels and there secured it, as by glue.

50 u, u' , are cords wound around the wheels U, U' , respectively, but in different directions. Cord u extends over pulley V and is attached to weight W. Cord u' extends over pulley V' . By pulling downward on the depending end of cord u' the cord u is re-wound on pulley U. Shaft E is turned by weight W when latch K is forced out of engagement with the one of the arms H, h , which is in contact therewith.

Y, Y' , are, respectively, flexible connections attached to arms e, e' , of shaft E and to dampers C and B, respectively. Flexible connection Y extends over pulleys y, y , and flexible connection Y' extends over pulleys y', y' . By this arrangement of flexible connections Y, Y' , dampers C and B and shaft arms e, e' , on shaft E, a half revolution of such shaft will open one of said dampers and close the other one. Ratchet X permits wheels U, U' (which are attached together) to turn in one direction on shaft E.

The operation of the device is simple, and is substantially as follows;—The weight W is raised by pulling on the cord or wire u' thereby winding cord or wire u around wheel U, as the cord or wire u' is unwound from wheel U' . Weight W tends to turn wheel U and shaft E, and when end h' of latch K is forced out of engagement with the one of arms H, h , with which it is in contact (by the hammer m''), shaft E will turn one half around, thereby actuating the flexible connections Y, Y' , to move dampers C and B. The hammer m'' is actuated, as hereinbefore described, by the closing of the circuit in which the thermostatic member S, shaft E, and one or the other of the terminals Q, q , and I, i , and the arms H, h , are members. Such circuit is closed by the movement of the free end of the thermostatic member. As the shaft E turns the circuit is broken as the arm h' which is in contact with one or the other of the terminals I, i , moves on to contact with the other one of such terminals I, i . Such broken circuit must remain broken until the shaft E shall have made another half turn and the thermostatic member S is again in contact with the terminal of said circuit adjacent to such thermostatic member. In the mean time the remaining one of the thermostatic circuits is in operative condition by the arm h' coming in contact with the remaining one of the terminals I, i ; and whenever the thermostatic member comes into contact with the other terminal adjacent thereto, such circuit is closed. Action of the electromagnet and hammer m'' will again occur to release latch K from the one of the arms H, h , in contact therewith, and the shaft will make another half turn, (to its initial position). The operation is repeated so long as the weight W is suspended and movement of the thermostatic member from one of the terminals Q, q to the other of such terminals is occasioned by change in temperature of the space of chamber in which it is placed.

Having thus described my invention and the operation of a device embodying the same, what I claim as new and desire to secure by Letters Patent is,—

1. A plurality of electric circuits and a thermostatic member in said circuits, in combination with an electromagnet, a vibratory

hammer, an armature to the magnet mounted on the hammer, a rotatable shaft provided with a plurality of radial arms, a damper connection on said shaft, a latch, 5 the arms on the shaft arranged to be successively brought into engagement with the latch and such hammer arranged so that on the vibration thereof blows are delivered thereby on the latch to force the latch from 10 such engagement, a plurality of electric terminals adjacent to the shaft, an electrical conductor on the shaft arranged to be successively brought into electrical contact with the terminals adjacent thereto, the conductor 15 on the shaft and the hammer and coils of the electromagnet arranged to form elements common to said plurality of electric circuits, and the terminals on the pivoted lever and adjacent to the rotatable shaft arranged to 20 respectively form elements in said circuits; substantially as described.

2. The combination of a thermostatic member, electric terminals arranged so that the 25 expansible element of the thermostatic member is successively brought into contact there-

with, an electromagnet, a vibratory hammer, an armature to the magnet mounted on the hammer, a rotatable shaft provided with a plurality of radial arms, a damper connection on said shaft, a latch, the arms on the 30 shaft arranged to be successively brought into engagement with the latch, and such hammer arranged so that on the vibration thereof blows are delivered thereby on the latch to force the latch from said engagement, a plurality of electric terminals adjacent to the shaft, an electrical conductor on the shaft arranged to be successively brought 35 into electrical contact with the terminals adjacent thereto, the conductor on the shaft 40 and the coils of the electromagnet arranged to form elements common to a plurality of electric circuits, and the terminals adjacent to the expansible member and to the rotatable shaft arranged to respectively form 45 elements in said circuits.

FREDRICK C. GUPTILL.

In the presence of—

FRED. L. KILBYS,
S. K. PHILLIPS.