

(No Model.)

H. G. FISKE.

Electric Signal Apparatus.

No. 229,529.

Patented July 6, 1880.

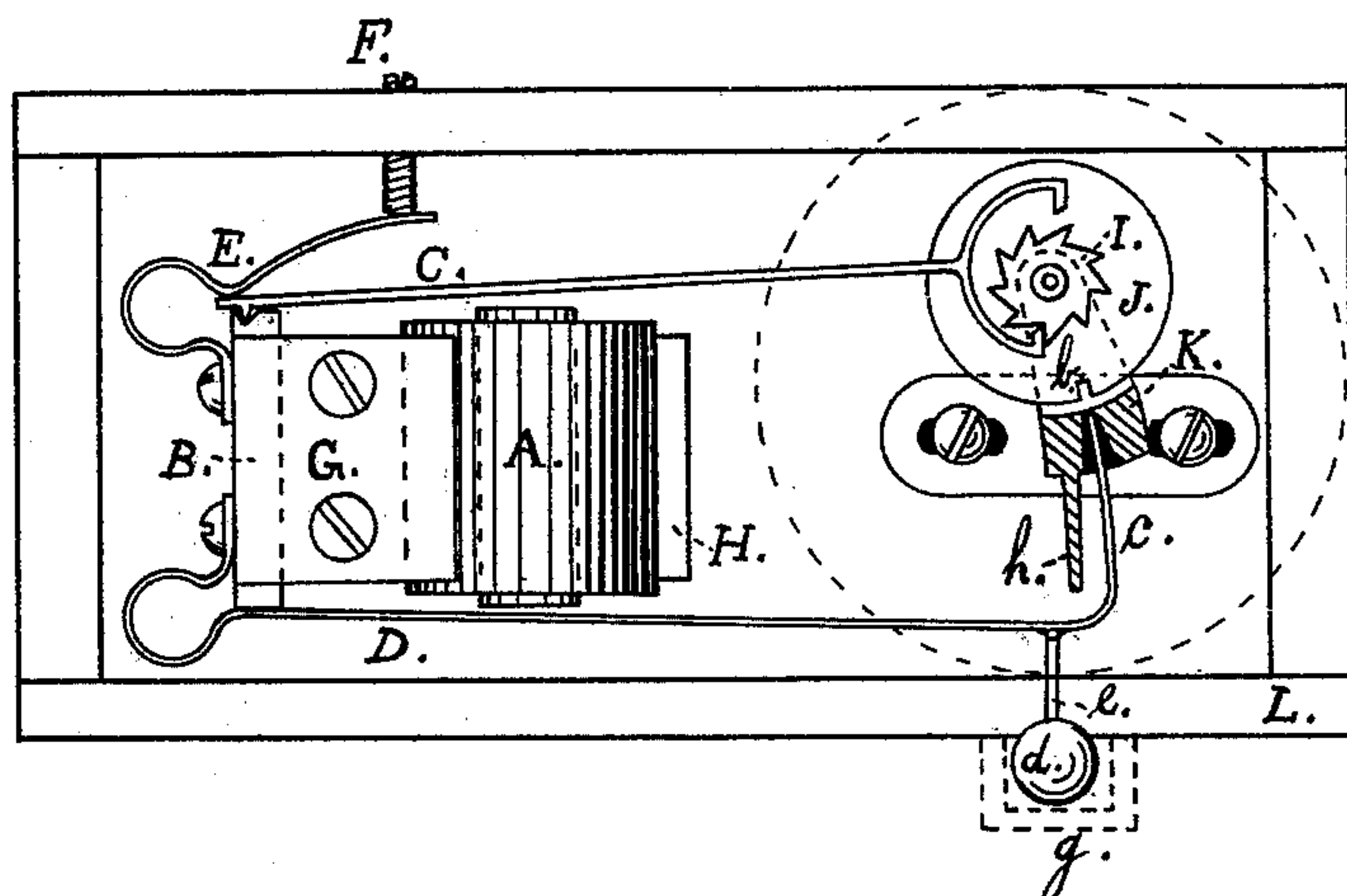


Fig. 1.

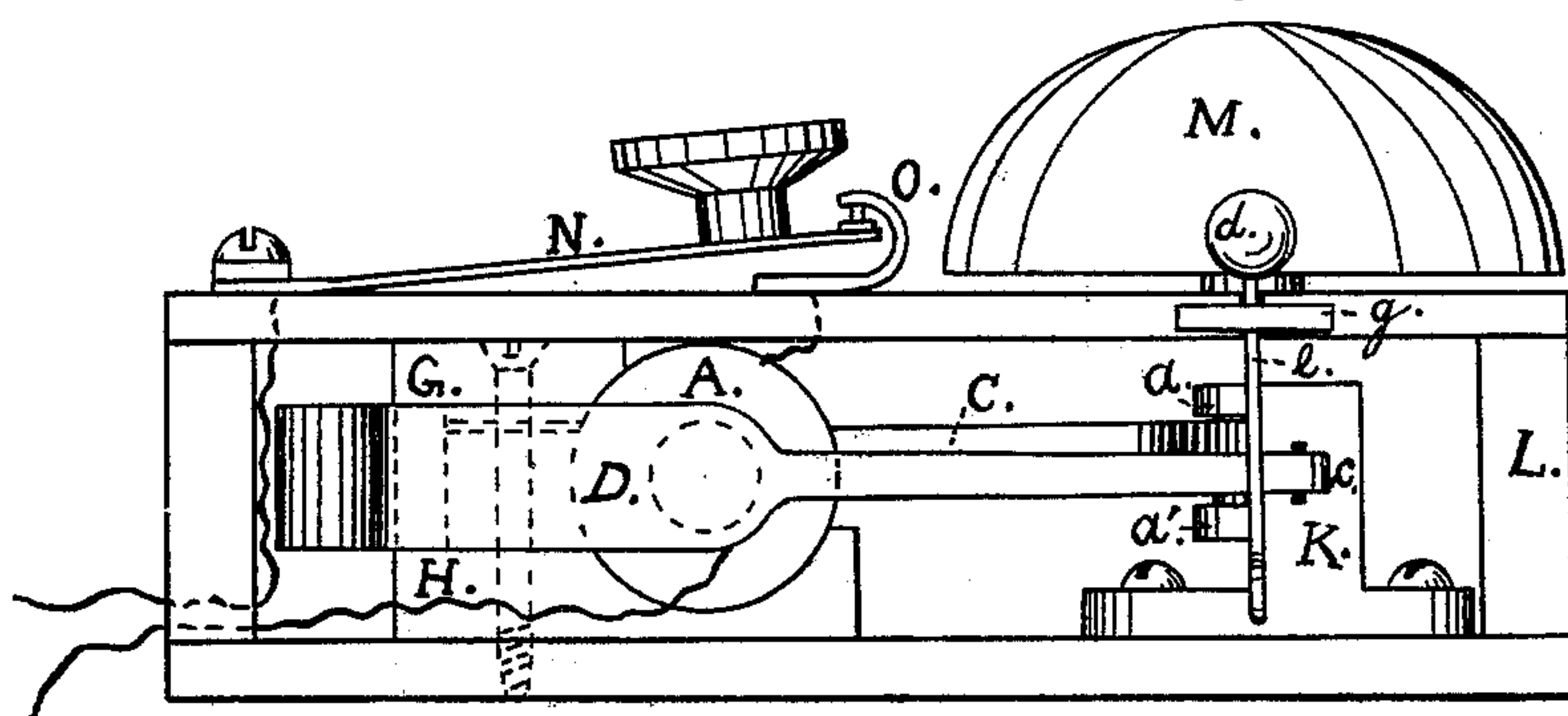


Fig. 2.

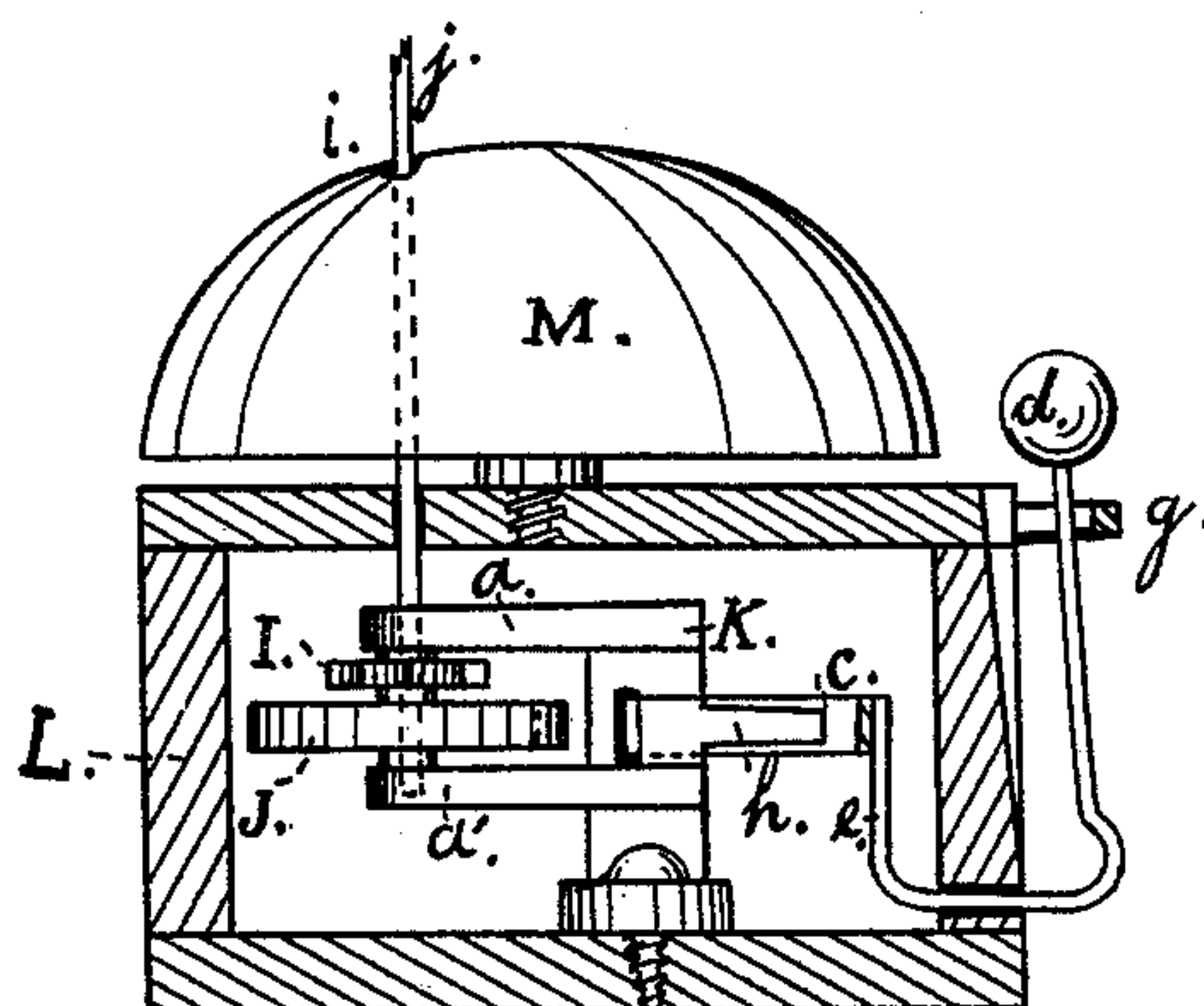


Fig. 3.

Witnesses;

*A. P. Cowl*  
*A. C. Huntemann*

Inventor;

*Henry G. Fiske.*



# UNITED STATES PATENT OFFICE.

HENRY G. FISKE, OF SPRINGFIELD, MASSACHUSETTS.

## ELECTRIC SIGNAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 229,529, dated July 6, 1880.

Application filed March 4, 1880. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY G. FISKE, of Springfield, Massachusetts, have invented new and useful Electric Signaling Apparatus, of

5 which the following is a specification.

My invention relates to improvements in electric signaling apparatus for telephone and telegraph lines in which it is desirable to call separately one out of several stations without

10 disturbing all on the line; and the objects of my improvements are, first, to provide a magnetic ratchet with means for controlling the sounding of the call or bell; second, to combine in one magnet the motive power to oper-

15 ate the ratchet-wheel and the call; and, third, to make a delicate and simple ratchet-lever pivot or bearing at the magnet end.

I attain these objects by the mechanism illustrated in the accompanying drawings, in

20 which—

Figure 1 is a plan view of my invention, and shows the apparatus inclosed in a small box, the cover of which has been removed, and with it a circuit-breaking key, the bell, and bell-hammer protector, the relative location of the

25 two latter being shown by the large dotted circle and the double right-angled dotted lines outside of the box surrounding the bell-hammer. The upper section of the casting which

30 supports the ratchet-wheel shaft is also removed for the purpose of showing the arrangement of the bell-controlling apparatus. Fig. 2 is a side elevation of my invention with its containing-box, the side of which latter being

35 removed to shown the apparatus within; and Fig. 3 is a transverse section of an end elevation of the box, the bell-armature lever, and of the bell-hammer protector.

Similar letters refer to like parts throughout

40 the several views.

The magnet varies a little from the ordinary construction, and consists of an iron core wound with insulated wire, and is marked A, this part being simply a bar electro-magnet; but with

45 this I combine the iron bar B and the iron or steel armature of the bell-hammer lever, (marked D,) that being adjusted to operate more easily than the ratchet-lever, which is marked C, for the purpose of adapting it to vibrate with

50 weaker or more rapid electric pulsations. The magnet is therefore at first only a bar electro-

magnet; but its action on the lever D unites it with the bar B, and thus forms a horseshoe electro-magnet, which is more powerful than the simple bar-magnet, and will, of course,

55 have a stronger influence on the lever C, and admit of a greater difference of tension between the two levers.

The lever C is hinged on B, with a V-shape bearing, and secured there by the aid of the

60 spring E and a screw passing through an oblong slot in the spring, and thence into B, and I am enabled to adjust the tension of the spring by the aid of the said screw and slot; but for greater convenience I adapt the spring to be

65 adjusted by the aid of the screw F.

The lever C may be held in the V-shape bearing sidewise by a pin or any suitable projections on the sides of the bearing.

The coil A and bar B are unitedly held in

70 their respective places by the clamp G H and the screws which secure them to the box.

The levers C D, as a matter of simple construction, are each made to combine armature and lever and D its withdrawing-spring in

75 one. C is provided with means to adapt it to revolve the toothed wheel I, and with it the disk J, both of which latter are shown arranged rigidly upon one common shaft. This shaft is, as a matter of convenience, made hol-

80 low, and a wire slipped through it and the upper and lower arms, *a a'*, of the casting or frame K.

The periphery of J is provided with a slot, *b*, shown in position opposite the plunger *c*,

85 which is adapted to permit the said plunger to play into it when in that position, and may be quite deep, or of just sufficient depth to check the plunger from enabling the bell-hammer *d* to reach the bell M with a single pulsa-

90 tion, the plunger *c* being arranged in connection with the lever D and the bell-hammer *d*. The latter is secured to the outer end of an elastic arm, *e*, which is an extension of the lever D, and is adapted to vibrate in response

95 to electrical pulsations.

The outer end of the arm *e*, with the hammer *d*, being outside of the box L, the arm is liable to get bent out of place, to avoid which I provide the protector *g*, which may be made

100 of wire or any suitable material, and surround the arm or the hammer on three sides at least,



but is adapted to give the hammer free play within the inclosure, the bell M answering to protect it on the fourth side.

The protector is preferably secured to the box very near to the hammer.

The arm *h* is arranged to receive the thrust of the lever D when the plunger *c* is playing into the slot *b*, but may be dispensed with if the plunger bottoms in the disk J, or is provided with other means to regulate the throw of said plunger, and with it the bell-hammer. In case there is no such stop or check the hammer will simply strike the bell once for as many slots (like *b*) as there may be in the disk J. When the slot in the disk is turned past the plunger, the latter will then meet the outer surface of said disk in its forward movement, and will thus prevent the hammer from reaching the bell, even when rapidly vibrating.

When the single stroke of the bell, as above described, is not objectionable, the apparatus may then be adjusted to operate with two batteries, one weaker than the other, the stronger to operate the ratchet, and, of course, with it the lever D, ringing the bell once for each slot in the disk J. The weaker battery may then be used to operate the bell either slowly or rapidly; but when a single current of electricity is used the pulsations which are used to operate the bell must be sufficiently rapid to obviate operating the ratchet by them.

The plunger *c* is guided in place by passing through a slot in the frame K.

The bell M is secured to the cover of the box L directly over the ratchet-wheel shaft, that being the most convenient location, which enables me to bring said box and bell within a very small space; but by arranging the bell in this place it is then in the way of extending the ratchet-wheel shaft for the purpose of securing to it a pointer to turn over or in close proximity with a dial by which to see the position of the ratchet-wheel; and to overcome this I make a hole through the bell sufficiently large to admit of the free passage and turning of the pointer-shaft *j*, and am thus enabled to secure the dial and pointer directly over the bell and bring the whole within a very small space.

By a slight additional expense and arranging the bell centrally over the ratchet-wheel shaft the hole may be made lengthwise through the post which supports the bell, thus giving the bell and dial a more central and compact appearance.

The key, consisting of the lever N and the raised strip O, is provided with the usual platinum points, and is arranged to break the electric circuit, for the purpose of enabling the main office to operate the ratchets throughout the line, and so obtain access to and call any station on the line with the aid of a break-piece adapted to operate rapidly the vibrating bell at that station. The key N O is also adapted to use in calling the main office from one of the stations.

As this apparatus is especially intended for

the purpose of calling from a central or main office one or more stations out of several on a line without disturbing any of the others, the apparatus at the main office will necessarily be of a somewhat different nature, as at this point all the signals from the stations should be heard; and so the disk J, plunger *c*, and the arm *h* may all be dispensed with; but, of course, it will be necessary to provide the ratchet-wheel shaft with the extension or pointer shaft *j*, and have a pointer secured to its top or end and arranged to rotate in close proximity to a dial, substantially as herein described, for the purpose of enabling that office to make the proper call; and that office will need some form of break-piece, adapted to divide the electricity into short and rapid impulses, for the purpose of ringing whatever bell is desired. Any of the well-known forms will answer for this purpose; or the key N O may be adapted to accomplish this object. The battery is also supposed to be at the main office. Each station, then, should be provided with simply the apparatus shown in Figs. 1, 2, and 3, without the shaft *j* or the hole *i* in the bell, but having the slot *b* set to a different tooth of the ratchet-wheel for each station.

The operation then will be as follows: The apparatus being arranged as described, and the proper electric connections being made, (for convenience I say there are eight stations and a main office on the line,) the operator at the main office wishes to call No. 5. He looks at the pointer and finds it at, say, No. 7. He then breaks the circuit twice rather slowly, and the pointer, moving one number to each break, then stands at No. 0. Five more breaks then bring it up to No. 5. Now, as each station has the slot *b* in the disk J set to correspond with its number on the ratchet-wheel, the apparatus of station No. 5 will be found nearly ready to allow a free play of the plunger *c*, so that when the operator at the main office divides the electricity into short and rapid impulses the magnet will no longer retain the ratchet-lever, and it, in being drawn away by the action of the spring E, gives the ratchet-wheel another hitch, and brings the slot *b* in front of the now vibrating plunger *c*, its scope of vibration being now increased, and the hammer *d* thus brought nearer the bell M. It, after a few vibrations, acquires sufficient momentum to reach and strike the bell violently and rapidly. The operator at the station then replies by simply breaking the circuit with the key N O. This, of course, stops his own bell and that of the main office, the latter having been ringing in response to every break and closing of the circuit. The main-office operator will then stop the vibrating break-piece, which will give the electricity its full power upon the magnetic ratchets. The operator will then proceed to make known his wants through the telephone or otherwise.

When one of the stations wishes to call the main office, the operator simply breaks the circuit with the key N O a few times, and by so



doing rings the main-office bell once for each break.

It will be seen from the foregoing that many of the parts may be varied somewhat in shape and material without seriously affecting the efficiency of the apparatus—as, for instance, the bar B may be made of other material than iron or steel, and still answer to pivot the lever C upon and secure D E in place. If E be made of steel, it may be brought in contact with D, and the two will then take the place magnetically of iron or steel in the bar B, and so retain nearly if not quite the full strength of the magnet. The armatures and levers may be made in separate parts without harm, and may be pivoted in any suitable manner, if provided with suitable means to draw them away at one end of the levers from the magnet, springs being used in the arrangement described. The key N O may be of any desirable form, and the single coil A may be replaced with two or more coils and separate magnets arranged to operate the ratchet and the bell-hammer, and the ratchet may be of any of the well-known forms, adapted to rotate the disk J.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the disk J, having the slot *b*, with the plunger *c* and the regulating-stop *h* or its equivalent, the disk being adapted to rotate with the aid of an electro-magnetic ratchet and the plunger to vibrate in connection with an electro-magnetic bell-hammer, and all being arranged to so adjust and control the movements of the hammer that

it cannot reach and strike the bell except when the plunger is vibrating rapidly into the disk and is suddenly checked in its forward movements by the stop *h* or its equivalent, for the purposes herein substantially shown and described.

2. The combination of the bar electro-magnet A with the bar B and the armatures of the ratchet-lever C and the bell-hammer lever D, when the latter are arranged at the opposite ends of A and the lever C is adapted to rotate the ratchet-wheel I and the lever D to operate the bell-hammer, substantially as shown and described.

3. In a ratchet-lever, the V-shaped pivot or bearing, in combination with the spring E, when the latter is arranged to retain the lever against its bearing, substantially as shown and described.

4. The combination of an electro-magnetic ratchet with an electro-magnetic bell or call, when the former is adjusted to operate in response to only comparatively slow electrical impulses and is adapted to mechanically control the striking of the hammer on the bell or call, and the latter is adjusted to operate only in response to several rapidly succeeding electrical impulses, all being arranged for the purpose of operating the ratchet and striking the bell or call independently of each other upon the same electric circuit, substantially as shown and described.

HENRY G. FISKE.

Witnesses:

D. P. COWL,  
J. P. TOWN.