

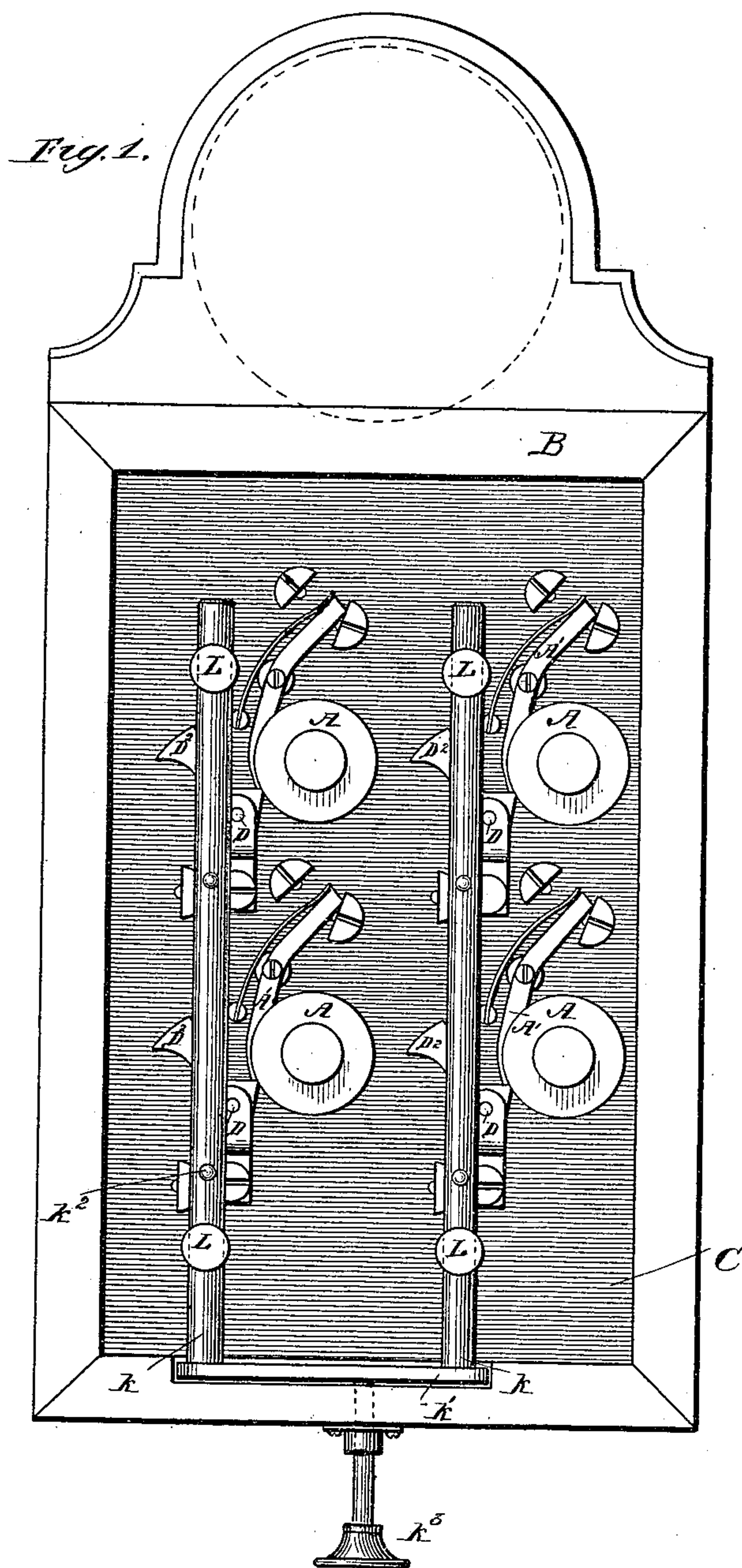
(No Model.)

2 Sheets—Sheet 1.

J. W. HOFFMAN.  
ELECTRIC ANNUNCIATOR.

No. 377,256.

Patented Jan. 31, 1888.



*Witnesses.*

*W. Rossiter*  
*L. S. Logan*

*Inventor.*

*John W. Hoffman*  
*By Chas. G. Page*  
*Atty.*

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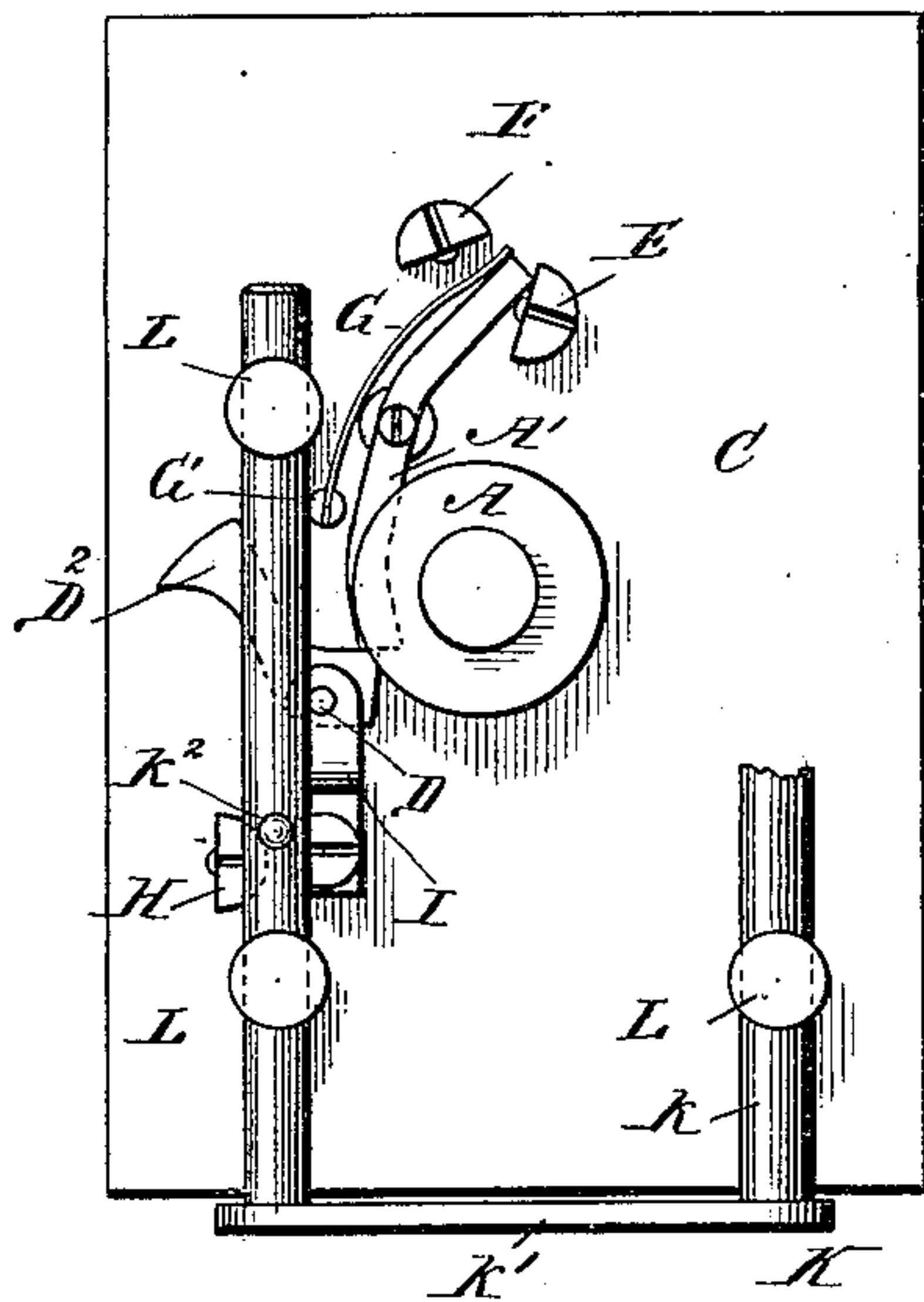
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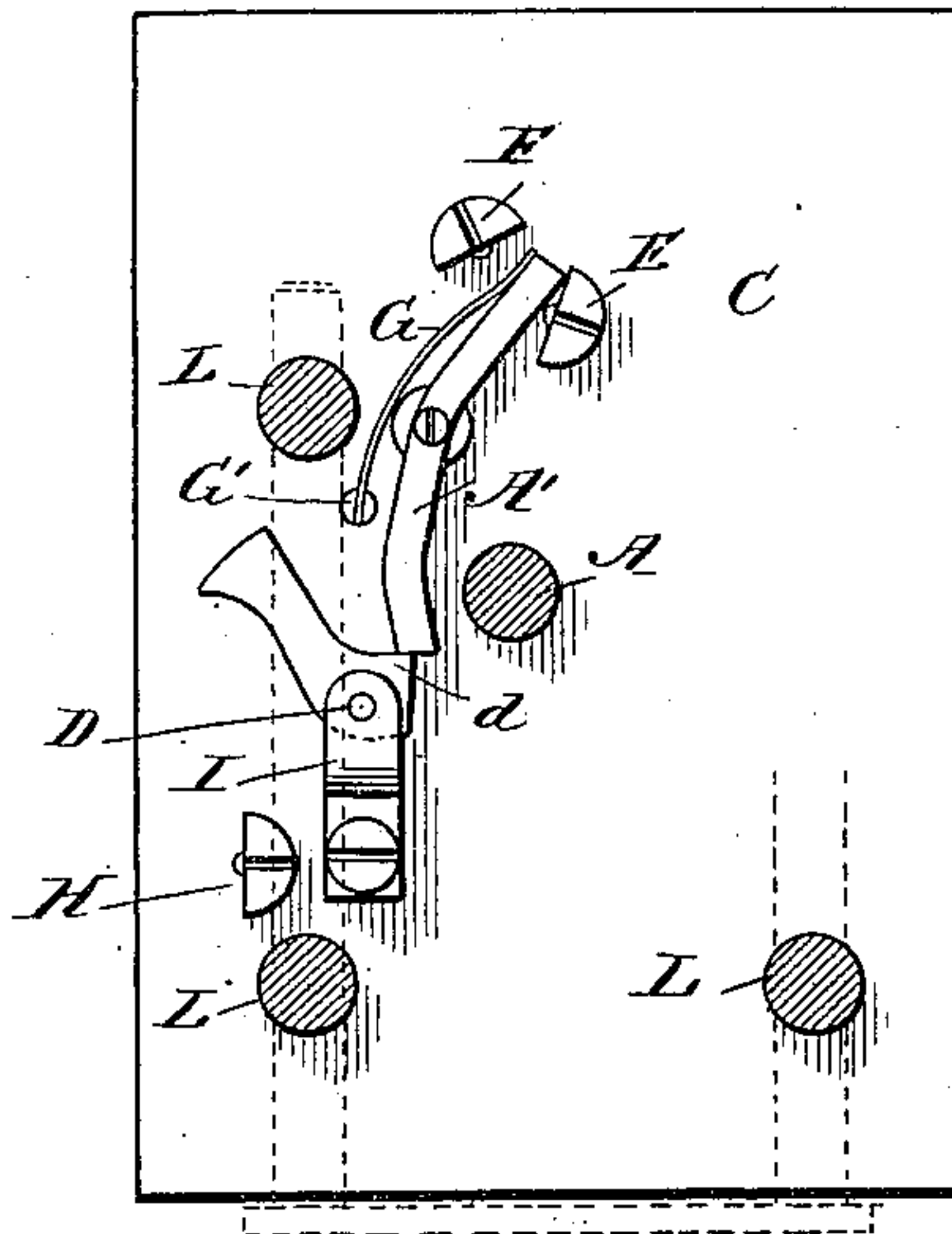
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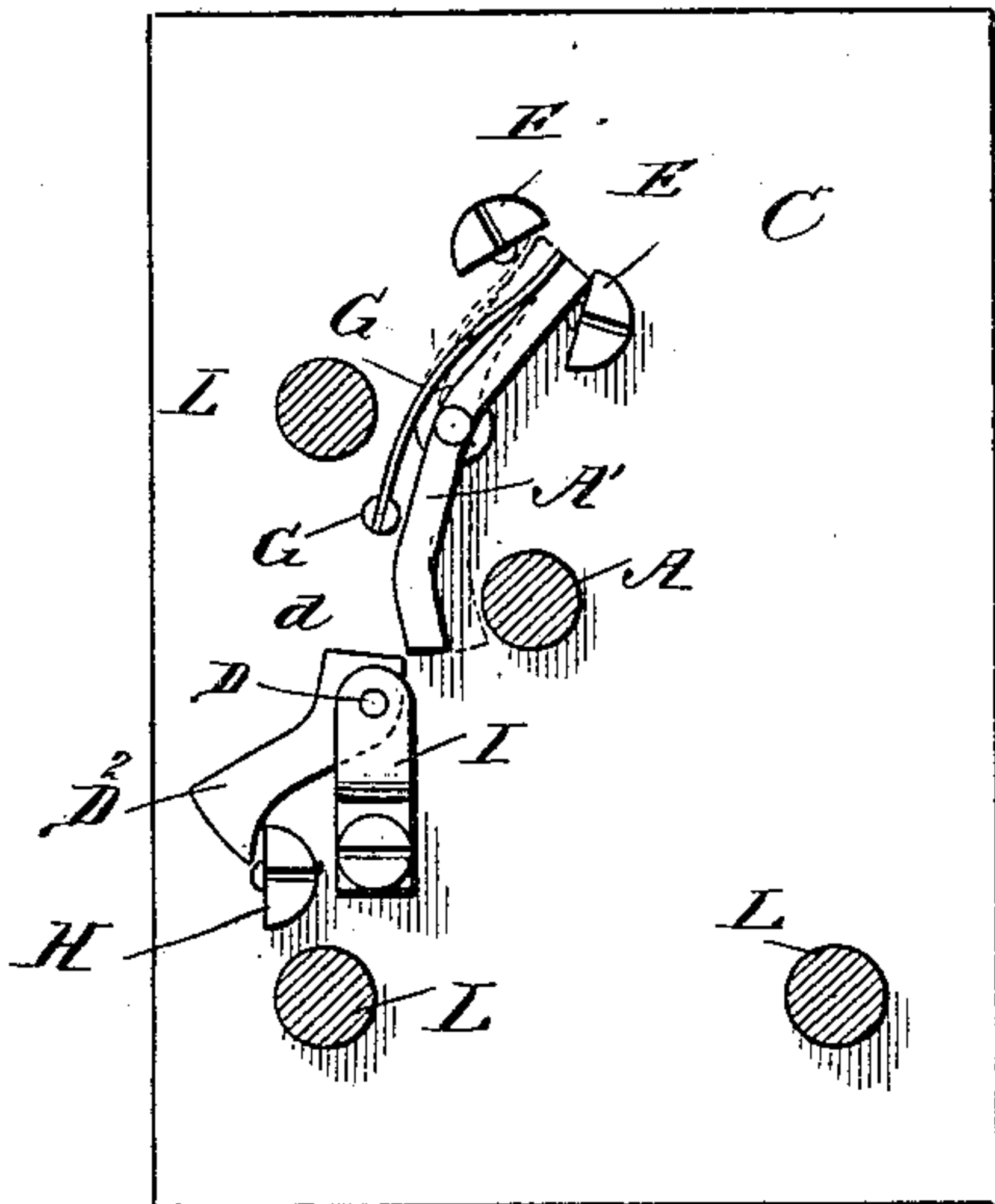
*Fig. 2.*



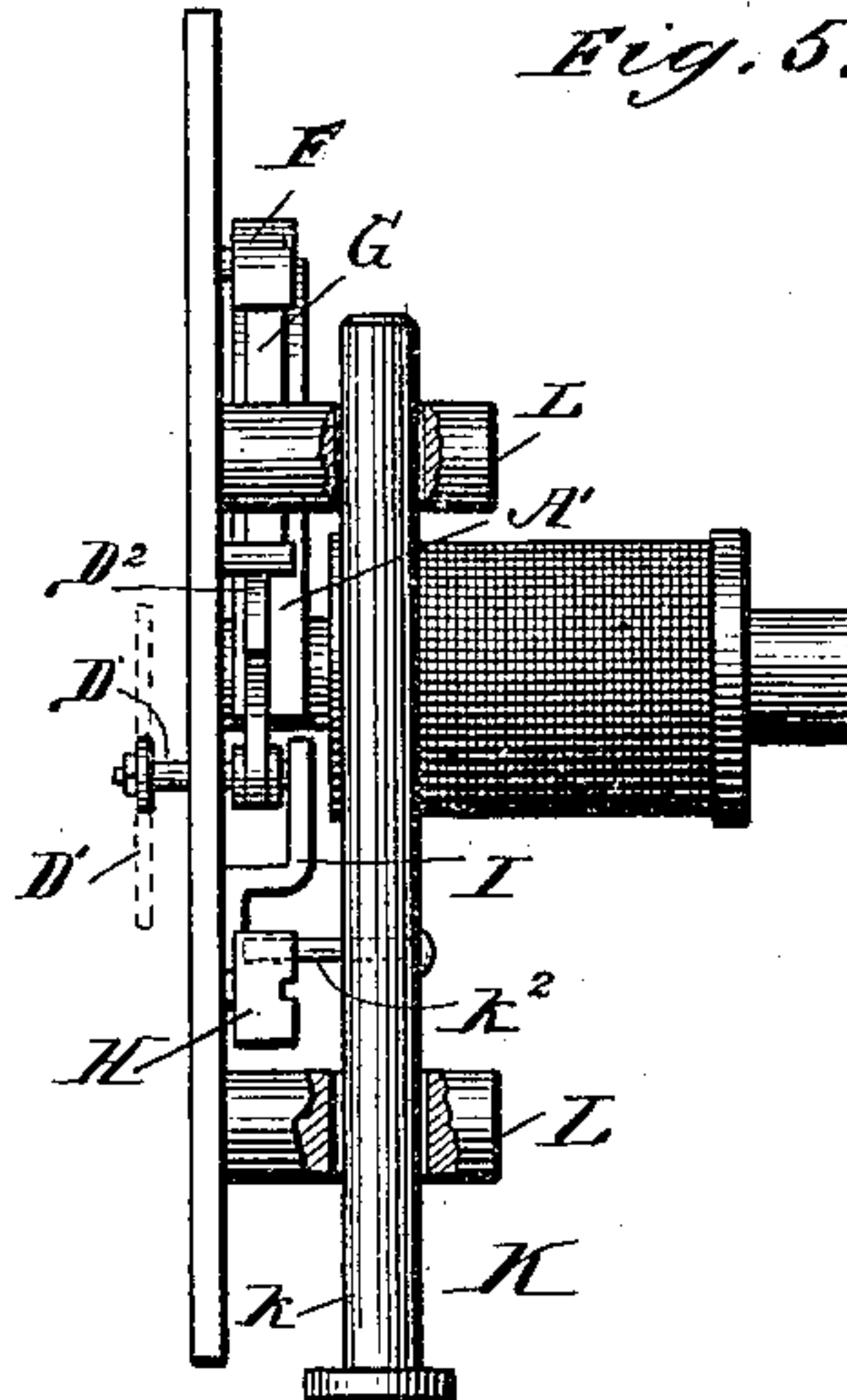
*Fig. 3.*



*Fig. 4.*



*Fig. 5.*



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# UNITED STATES PATENT OFFICE.

JOHN WILLIAM HOFFMAN, OF PULLMAN, ILLINOIS.

## ELECTRIC ANNUNCIATOR.

SPECIFICATION forming part of Letters Patent No. 377,256, dated January 31, 1888.

Application filed March 24, 1887. Serial No. 232,322. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN WILLIAM HOFFMAN, a citizen of the United States, residing at Pullman, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Electric Annunciators, of which the following is a specification.

This invention relates to an improvement in electric annunciators wherein each of the several index-hands or other devices usually employed for denoting the particular locality of a call is at one extremity of its throw or movement held subject to the position of the armature of an electro-magnet, which latter, when excited, serves to attract the armature, so as to release the index-hand or other like device and permit the same to swing or move to the opposite extreme of its permitted movement, thereby indicating by its change of position that a call has been made from the particular room or other locality it is employed to represent.

A prominent feature of my invention relates to the provision of simple and efficient means for holding the index-hand or indicating device positively subject to the position of and securely locked by the armature of the electro-magnet as long as the armature remains unattracted, but at the same time permitting the free and ready releasement of the index-hand or indicating device from the control of the armature as soon as the latter is attracted, thereby allowing the armature to stand readily responsive to the attractive energy of the magnet.

A desirable and important object involved in the foregoing feature consists in the avoidance of any accidental displacement of the index-hand or indicating device from the control of the armature by reason of the jolting motion of a railway-car wherein the annunciator may be placed, thereby preventing the occurrence of false indications of calls and promoting the efficiency and utility of electric annunciators for service upon railway-cars.

Among the remaining features of my invention may be noted certain details involving the following several objects—to wit, to vary or adjust the extent of locking contact between the armature and an arm upon the spindle of an indicator-hand; to vary the extent of throw or movement on the part of the index-hand or indicating device, whereby a uniformity of

throw can be maintained throughout the entire set or sets of index-hands usually employed; to limit the movement of the armature toward the magnet, so as to prevent actual contact between the two, and thereby avoid any liability of the armature clinging to the electro-magnet in case the latter should become permanently magnetized to an extent which would otherwise interfere with the free working of the apparatus.

To the attainment of all of the foregoing ends my invention consists in matters hereinafter described, and particularly pointed out in the claims.

In the drawings, Figure 1 represents in rear elevation an electric annunciator embodying my invention. Fig. 2 represents in rear elevation a portion of the back plate with the devices for controlling one of the index-hands or indicating devices, the position of the armature being such as to lock the index-hand. Fig. 3 is a view similar to the preceding figure, but representing a section taken through the several guide-posts and the magnet on a plane parallel with the back plate, the slide for lifting the arm of the index hand spindle being represented in dotted lines. Fig. 4 is a view similar to the last preceding figure, but with the arm of the index-hand spindle at the lowest limit of its throw. This view also represents in dotted lines the position of the armature when it is attracted by the magnet. Fig. 5 is an edge view of the devices shown in Fig. 2, with portions of two of the guide-posts broken away for convenience of illustration.

In the several foregoing figures the usual connections between a battery and the several electro-magnets A, and also the usual connections between the electro-magnets and the push or pull buttons, that will in practice be disposed at points from whence calls are to be sent, are omitted, since these matters are common in electric annunciators and well known to those skilled in the art.

It will also be understood that an electric call-bell can be mounted upon the frame or case B, to be rung, as usual, when the current is directed through any one of the electro-magnets, and that the number of electro-magnets desirably secured upon an ordinary brass back plate, C, will be in correspondence with the number of index-hands, which latter can be secured upon oscillatory spindles and ar-



ranged in sets or rows opposite the front of the case, as usual.

With regard to my improved devices for controlling any one of the index-hands or indicating devices, particular reference may be made to the last four figures of the drawings, each of which includes the oscillatory spindle D of an index-hand, D', such as shown in Fig. 5, wherein the position of the index for denoting a call is indicated in dotted lines.

The spindle of the index hand or device carries an arm, D<sup>2</sup>, which said arm is rigid with the spindle and secured thereto a short distance back from one of its ends.

The armature A' consists of an oscillatory bar which is made either straight or slightly curved from end to end and pivoted at a point between its ends. The upper end of the armature extends between a couple of cam-stops, E and F, which serve to determine the extent of its throw or vibratory movement, while the lower end portion of the armature hangs opposite a portion of the core of the magnet that is exposed between the back plate and the coil of the electro-magnet.

The upper end of the armature is normally held against the cam-stop E by the action of a spring, G. This spring is at its lower end secured to a stud, G', upon the back plate, and is arranged with its free upper end bearing against the upper end portion of the armature in a manner to normally hold the upper end of the armature against the cam-stop E, as aforesaid, and thereby hold the lower end of the armature off from the magnet.

The arm D<sup>2</sup> of the index device will, when free from the armature, drop substantially into the position shown in Fig. 4, wherein the limit of the down throw or swing of the arm is determined by a cam-stop, H. The arm D<sup>2</sup> is to be swung up from its said lowered position for the purpose of restoring the index-hand to the position it is to occupy preparatory to a call or signal and of placing the said arm in engagement with the armature, in order to hold the index-hand in position until a call is made and the armature drawn away from its engagement with the arm.

During the upward swing of the arm for the foregoing purposes the corner d of the arm will, in striking and passing the armature, force the lower end of the latter toward the magnet, so as to swing the entire armature to some extent against the resistance of the spring G. As soon, however, as the corner d of the arm has passed the armature, the latter will be restored by the spring to its normal position, whereby the short end of the arm will simply lie under the lower end of the armature, as shown in Figs. 2 and 3, wherein the arm is understood to be in position to maintain the index-hand in the position it is to assume preparatory to a call. The arm D<sup>2</sup> will under such conditions be held positively subject to the position of the armature, and can by no possibility drop until the armature has been attracted to an extent to clear its lower end

from the path described by the short or inner end of the arm when the arm is permitted to swing about its pivoted center, it being seen that the force of the spring will hold the armature with its upper end against a stop or abutment and its lower end away from the magnet, and that any tendency on the part of the arm to drop will, so long as the armature remains unattracted by the magnet, simply assist in holding the upper end of the armature against the stop or abutment; but since the arm D<sup>2</sup> binds against the armature merely to an extent that is proportional to the weight of the longer end portion of the arm the frictional contact between the arm and the armature will be slight and insufficient to retard the free movement of the armature when the latter is attracted by the magnet.

As a matter of principle, the armature and the arm may each be considered as consisting of a straight piece, the slight curvatures herein shown being merely for appearance and to permit the mechanism to be made more compact.

From the foregoing it will be seen that, no matter how much the apparatus may be jolted or shaken, the spring will hold the armature in steady position free from the magnet as long as the magnet remains unexcited, and that so long as the armature is thus held the arm, after it has once been swung up to the highest limit of its up movement, will be positively prevented from dropping.

The normal position of the armature—that is to say, its position wherein it is held by the spring against the cam-stop E, or, in fact, any suitable stop located at such point—serves to permit the armature to present a positive check or stop to the downswing of the arm D<sup>2</sup> when such arm has been brought into position to place the index in its normal or set condition and bring the short or tail end of the arm D<sup>2</sup> under the lower end of the armature. The tendency of the weighted or heavier end of the arm D<sup>2</sup> to swing down can in no wise affect the armature, the short end of arm D<sup>2</sup> being simply pressed up against the lower end of the armature in a line of force toward the pivot and in a direction to press the upper end of the armature against the stop E, thereby simply co-operating with the spring in holding the lower end of the armature away from the electro-magnet, and yet a slight excitation of the electro-magnet will attract the armature and readily liberate the arm D<sup>2</sup>, whereby the great desideratum of the use of a light economical battery can be attained. This is due to the fact that while the spring acts against the armature above the pivot of the latter the armature, when attracted, will be attracted at a point below its pivot, and hence an efficient leverage obtained for counteracting the influence of the spring.

It will also be observed that the arm D<sup>2</sup> can be made light—just heavy enough to insure its dropping when released by the armature—since, no matter how much the car on which



the annunciator is employed is jolted, the arm, when once under the end of the armature, cannot escape until the lower end of the armature has been attracted by the electro-magnet.

5 The index-spindle D extends through the back plate, and in rear of the latter has a bearing conveniently formed in a cleat, I, that is secured to the back plate.

10 The stud G', to which the lower end of the spring is secured, is desirably located directly over the pivotal center of the arm D<sup>2</sup>, so that when the arm is swung suddenly up to an extent to permit the corner d of its short end to pass the lower end of the armature the stud  
15 G' may serve as a stop for limiting the upward swing of the arm, which latter, after striking such stop, will fall back into the position shown in Figs. 2 and 3.

20 The stop E subserves the purpose of an abutment, against which the upper end of the armature will be held by the spring so long as the armature is unattracted by the magnet, and as a stop or abutment it necessarily limits the extent to which the lower end of the armature  
25 can be swung away from the magnet. It is desired, however, to further utilize this stop, and to such end it is made cam-shaped, whereby not only can the extent to which the armature may be thrown away from the magnet be determined, but also the extent of contact be-  
30 tween the lower end of the armature and the arm D<sup>2</sup> be regulated, thereby varying the extent to which the armature must move before releasing the arm, and further permitting the  
35 desired position of the index preparatory to a call to be accurately determined, it being obvious that by adjusting the cam-stop E the normal position of the armature can be somewhat varied, and that the position of the arm  
40 D<sup>2</sup> will depend upon such normal position of the armature.

45 The stop F serves to prevent the armature from being drawn into actual contact with the magnet, and is desirably made cam-shaped, so that the space which it is desired shall intervene between the magnet and the armature when the latter is attracted can be regulated with great nicety.

50 The stop H determines the drop of the arm D<sup>2</sup>, and hence determines the extent of movement on the part of the index after the arm has been released of the armature. This stop is also made cam-shaped, whereby the throw of the arm can be accurately determined, and  
55 hence where quite a number of index-hands are employed the stops of the nature of stop H can be set so that the several index-hands shall have a uniform extent of throw, and thereby be made to assume corresponding po-  
60 sitions. In this connection it may be observed that an annunciator wherein the index-hands, either originally or as a result of use, point in different directions at times when they should point in one direction is a constant source of  
65 annoyance.

The slide K, (shown in Figs. 2 and 5,) for lifting the arm D<sup>2</sup>, consists of a couple of slide-rods, k, rigidly connected together at their lower ends by a cross-piece, k', with one of the rods provided with a pin, k<sup>2</sup>, for engaging the  
70 arm D<sup>2</sup> when the slide is raised.

The posts L on the back plate are provided with guide-openings for the slide-rods, and serve to guide and steady the same. It is un-  
75 derstood, however, that the slide will be provided with a suitable handle, k<sup>3</sup>, as in Fig. 1, and that the rods k can be lengthened and multiplied, the number of pins k<sup>2</sup> increased, and additional guide-posts L employed, all pro-  
80 portionally to the size of the apparatus, which, of course, will depend upon the number of index devices employed.

In Fig. 1 provision is made for operating four separate index hands or devices.

What I claim as my invention is—

85 1. In an electric annunciator, the combination, substantially as herein described, of the electro-magnet, the oscillatory armature A', consisting of a proximately-straight bar piv-  
90 oted between its ends, the spring applied to act against the upper end of the armature above the pivot thereof, and the arm D<sup>2</sup> of the index device, arranged to engage and bear  
95 upwardly against the lower extremity of the said armature and below the pivot thereof when said arm is in position to place the index in its set or normal condition, substantially as described.

2. In an electric annunciator, the combina-  
100 tion, substantially as herein described, of the electro-magnet, the oscillatory armature A', pivoted between its ends, the vibratory arm D<sup>2</sup> of the index device, arranged to engage against the lower extremity of the armature when said  
105 arm is in position to place the index in its normal or set condition, the spring applied against the upper end of the armature, and the cam E, against which the upper end of the armature is normally maintained by the spring,  
110 substantially as set forth.

3. The combination, substantially as de-  
115 scribed, of the electro-magnet, the oscillatory spring-controlled armature A', pivoted between its ends, the cam-stops E and F, between which the upper end of the oscillatory arma-  
120 ture is extended, and the arm D<sup>2</sup> of the index device, arranged to engage against the lower extremity of the armature when said arm is in position to place the index in its normal or set condition, substantially as described.

4. In an electric annunciator, the combina-  
tion, with the vibratory arm D<sup>2</sup> of the index device, of the cam-stop H, for limiting the extent of drop on the part of said arm, substan-  
tially as described.

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Witnesses:

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F. M. UNGER.