

(No Model.)

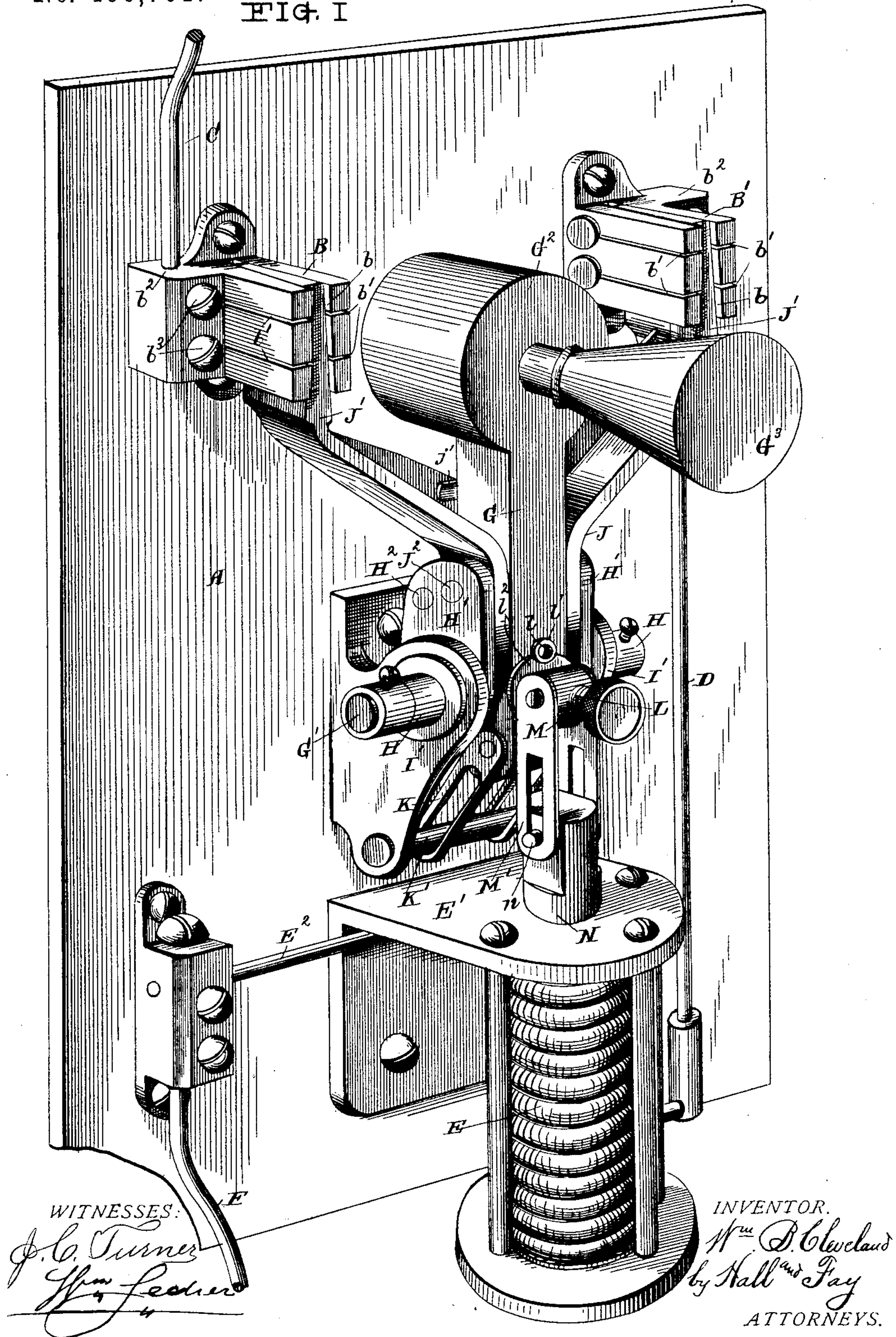
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W. B. CLEVELAND.  
AUTOMATIC SAFETY CUT OUT.

No. 460,701.

Patented Oct. 6, 1891.

FIG. I





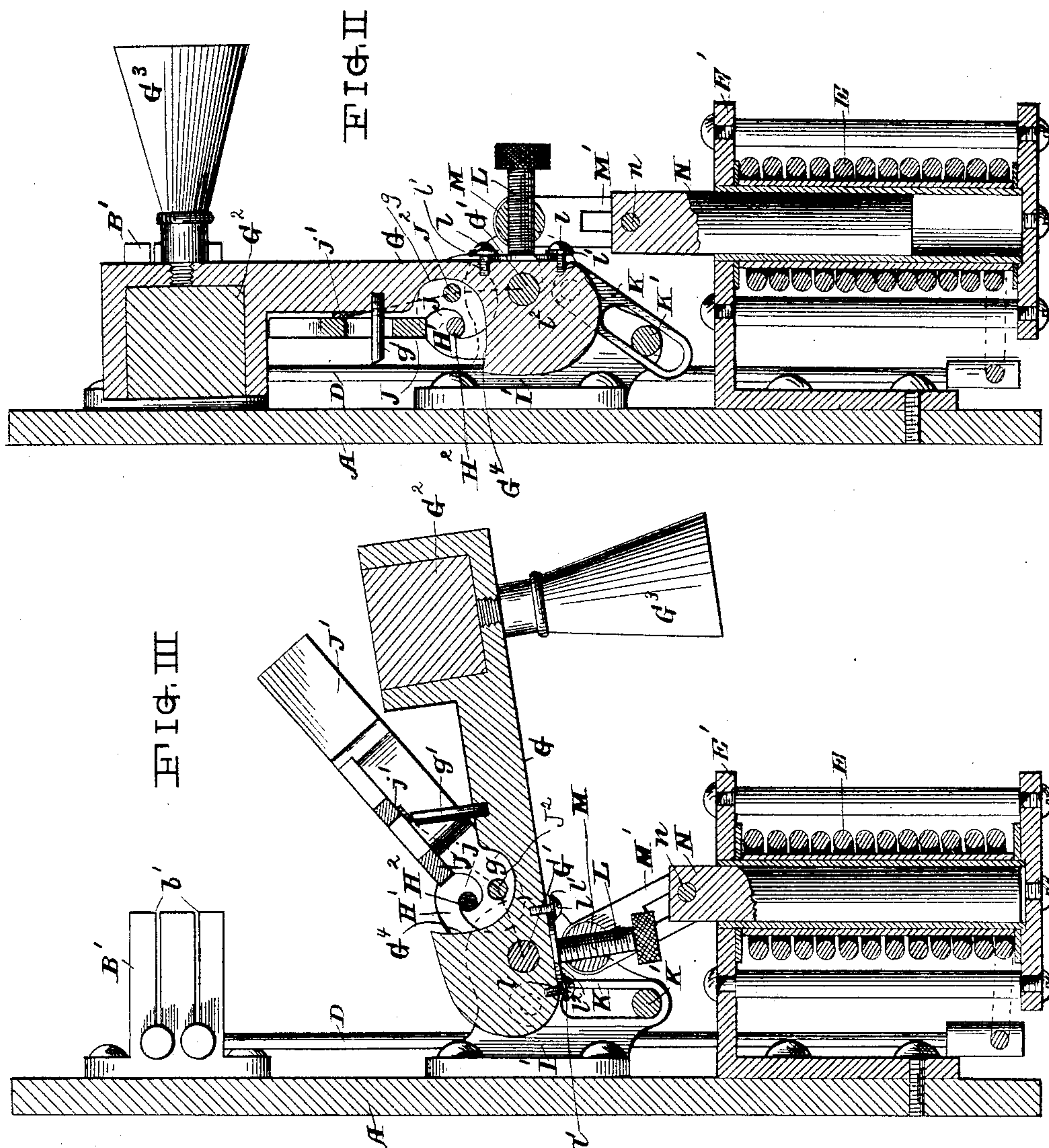
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ATTORNEYS.

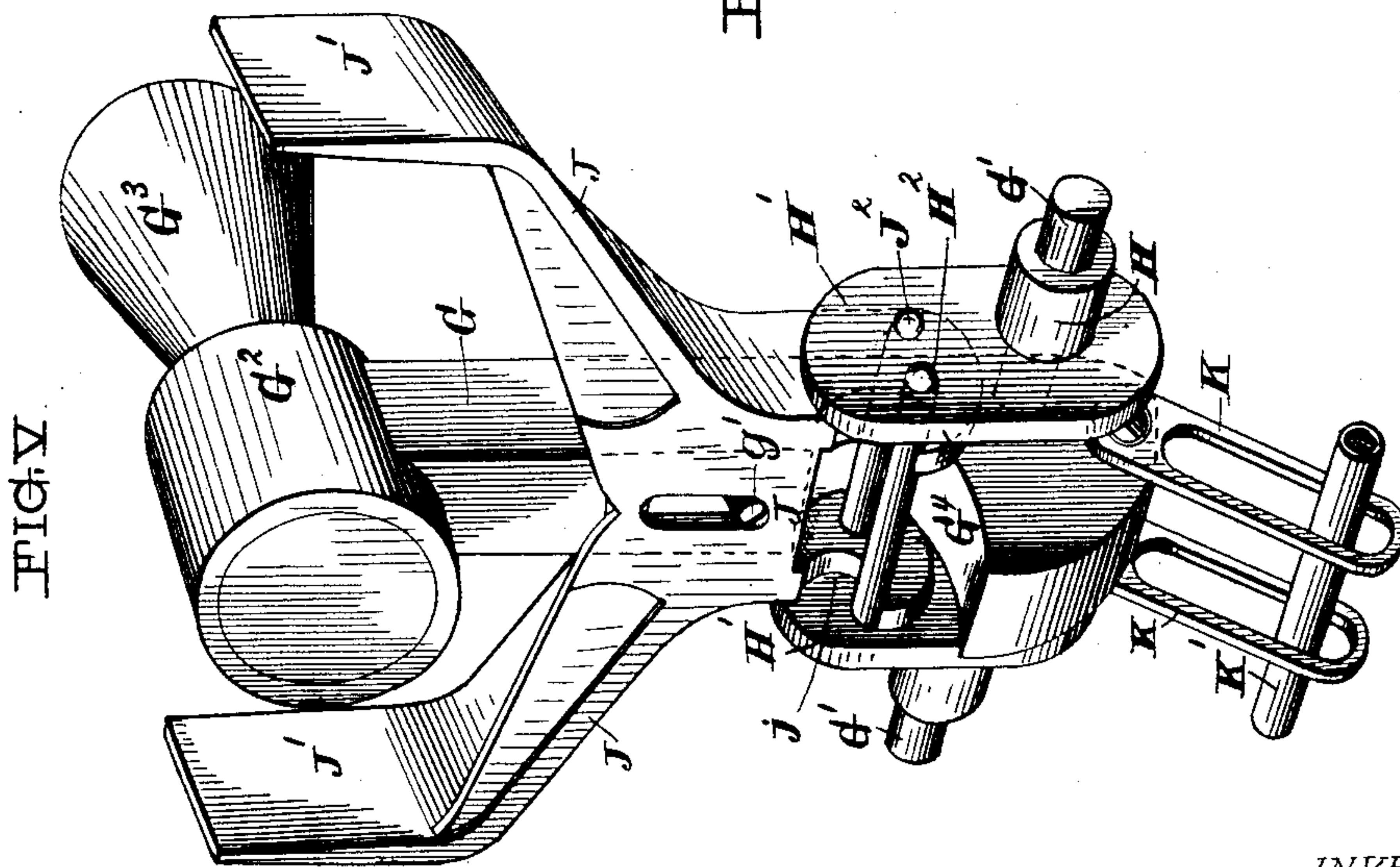
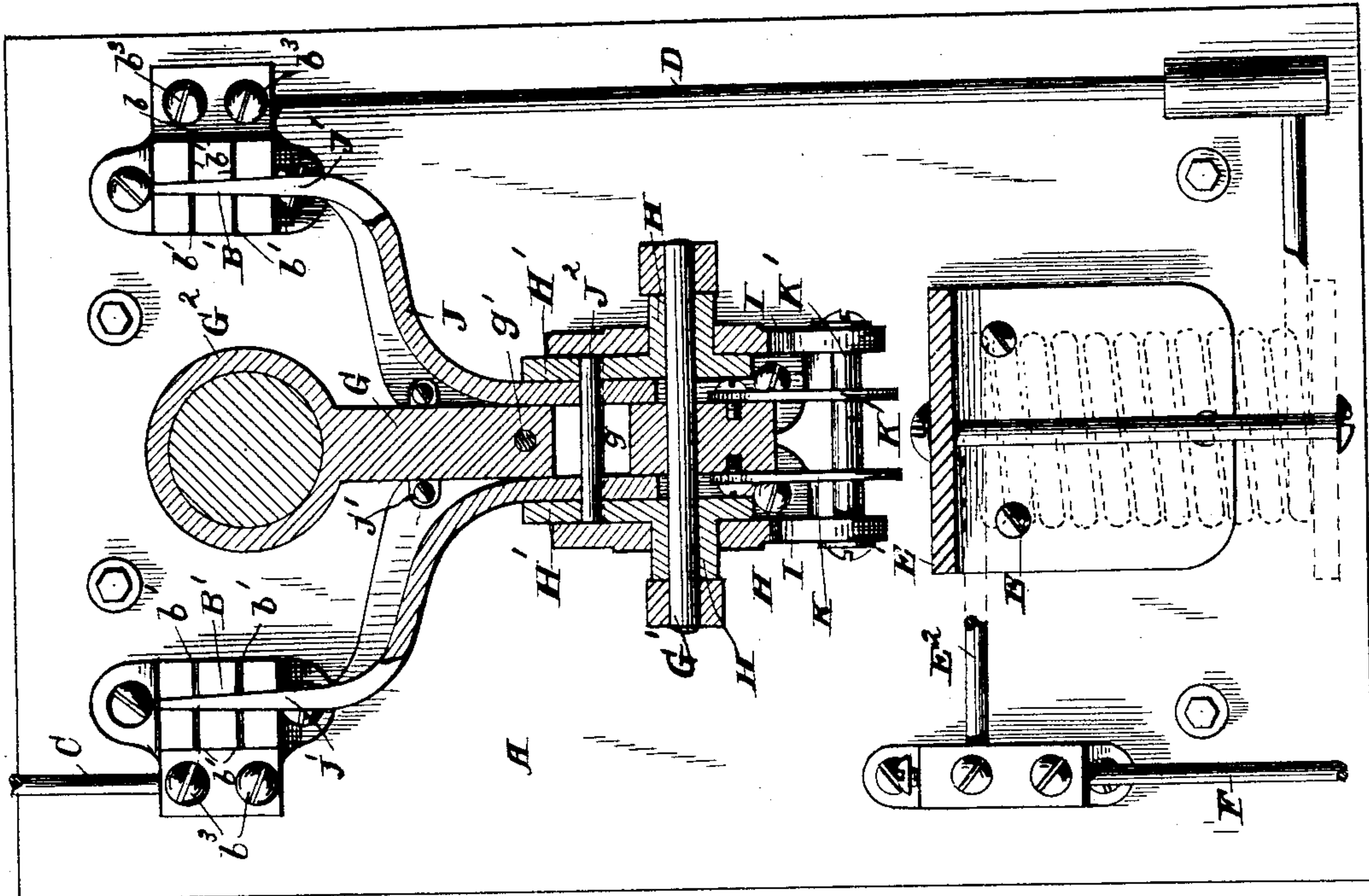
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# UNITED STATES PATENT OFFICE.

WILLIAM B. CLEVELAND, OF CLEVELAND, OHIO.

## AUTOMATIC SAFETY CUT-OUT.

SPECIFICATION forming part of Letters Patent No. 460,701, dated October 6, 1891.

Application filed June 8, 1891. Serial No. 395,469. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM B. CLEVELAND, a citizen of the United States, and a resident of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Automatic Safety Cut-Outs, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

The objects of my invention are to provide an automatic cut-out which is particularly applicable to large circuits, such as electric power or light circuits; to provide improved means for securing a perfect contact of the switch, and at the same time providing for the easy disconnection of the same, and to provide improved means for securing comparatively great sensitiveness in the action of the cut-out.

The annexed drawings and the following description set forth in detail one mechanical form embodying the invention, such detail construction being but one of various mechanical forms in which the principle of the invention may be used.

In such annexed drawings, Figure I represents a perspective view of my improved automatic cut-out; Figs. II and III, vertical sections of the same, illustrating, respectively, the device as closed and opened; Fig. IV, a vertical section taken through the pivot-bolt of the weighted arm and through the pivot-bolt of the switch-tongue, looking toward the base-plate; and Fig. V a perspective view from the rear side of the movable parts of the device.

In the drawings, the letter A indicates a plate of a suitable non-combustible and non-conducting material—such as soapstone, slate, or other material—which plate may be vertically secured to a suitable support and which forms a base for the entire apparatus.

Two split contacts B and B' are secured upon the base, have the sides of their slots or openings *b* slightly diverging, and have, preferably, slits *b'* in their sides to increase their elasticity. The contacts are provided with vertical sockets *b*<sup>2</sup>, having binding-screws *b*<sup>3</sup>, and a wire C, leading to the circuit, is secured to the socket of the contact B by means of the

screws *b*<sup>3</sup>. A heavy wire or rod D is secured in the socket of the contact B' and is continued in a coil E, supported by suitable brackets E' at the lower end of the base. The end of the coil is secured in a binding-socket E<sup>2</sup>, into which a wire F, leading from the generator, is also secured.

An arm G is pivoted with a horizontal bolt G' in two sleeves H H, which are journaled in two brackets I' I' upon the middle of the base. The outer end of the arm is enlarged and weighted, as shown at G<sup>2</sup>, and has an insulating-handle G<sup>3</sup>, secured in it for manipulating it. The inner face of this arm G has an outwardly-facing shoulder G<sup>4</sup>, and the pivotal bolt of the arm is passed through the inner end of the arm at a point slightly outside of a vertical line from the center of gravity of the arm when the latter is raised, so that the arm will be held in its raised position by the weight at its upper end, but may easily tilt outward by a slight pull upon it.

A forked switch-tongue J has the upper ends J' of its arms wedge-shaped, so as to enter the diverging contact-slots, and is pivoted upon a bolt J<sup>2</sup>, inserted through the outer ends of the two arms H' H', projecting from the inner ends of the sleeves H H. The arm G is formed with a notch or recess *g* for the passage of the bolt J<sup>2</sup>. A bolt H<sup>2</sup> is secured through the ends of the arms H' to the rear of the bolt J<sup>2</sup>, and the switch-tongue has a notch or recess *j* for the passage of said bolt. A stud *g'* projects from the inner side of the weighted arm G and may bear with its beveled end against a wear-plate *j'* upon the switch-tongue when the arm and tongue are tilted out. The longitudinally-slotted links K K are pivoted to the lower or inner end of the weighted arm and slide upon a bolt K', inserted through the lower portions of the brackets, serving as stops for the outward throw of the arm. A screw-threaded arm L is secured to the outer face of the weighted arm in a line with its pivotal bolt by means of screws *l* and washers *l'*, which overlap and bear against a circular disk *l*<sup>2</sup> upon the inner end of the screw-threaded arm. A nut M fits upon said screw-threaded arm and has two longitudinally-slotted links M', pivoted upon its sides. Said links are pivoted in their slots to studs *n*, projecting laterally from the up-



per end of an armature N, which moves within the coil E.

In practice the current passes from the generator through the wire F, coil E, wire D, switch-tongue and contacts, and out into the circuit-wire C, the wedge-shaped ends of the switch-arms being firmly wedged into the contacts.

The nut upon the screw-threaded arm, which projects from the weighted arm, is adjusted by turning the screw-threaded arm at a predetermined point, so as to give the attractive force of the coil upon the armature a certain leverage upon the weighted arm, and when the current through the coil reaches a certain degree of force which may be dangerous for the generator or for the devices supplied from the circuit the armature will be drawn down into the coil, pulling upon the screw-threaded arm, and thus tilting the weighted arm. On account of the knuckle or double joint between the short arms H' and the switch-tongue, the latter will first be pulled downward, when the shoulder of the weighted arm throws the short arms outward by striking the inner bolt H<sup>2</sup>. This will admit of the wedge-shaped ends of the switch-tongue being drawn downward in the slotted contacts, out of their tight hold in the same, before they are tilted forward, together with the short arms and the weighted arm. The longitudinally-slotted links at the lower end of the weighted arm will stop the outward throw of said arm and prevent it from striking the coil and armature. When the cut-out is again closed, the weighted arm may be tilted upward by means of its insulated handle and will raise the switch-tongue with it, the beveled end of the stud g' upon said arm bearing against the wear-plate of the switch-tongue. The narrow points of the wedge-shaped ends of the switch-tongue will easily enter the wide lower ends of the slotted contacts, and when at the end of the upward movement of the weighted arm the short arms and the switch-tongue are straightened out the wedge-shaped ends of the latter will be pushed from below upward into the contacts, forming perfect and tight contact. The beveled end of the stud g' may slip beneath the wear-plate j', as said wear-plate will be moved away from the pivot-bolt G' by the straightening of the short arms H' and the switch-tongue when tilted upward by the weighted arm G, as plainly indicated by the dotted lines G' J<sup>2</sup> j' in Figs. II and III, said lines showing by their changed angles how the short arms and switch-tongue are straightened and consequently the wear-plate pushed from its seat upon the stud g'.

This cut-out will be capable of adjustment, rendering it very sensitive and easily operated, as the nut upon which the armature exerts its traction may be adjusted upon the screw-threaded arm farther from or nearer to the pivotal fulcrum-bolt of the weighted arm. A vertical line from the center of gravity of

the weighted arm will fall a very short distance inside of the fulcrum of the arm, so that the two-armed bell-crank lever formed by the weighted arm and the projecting screw-threaded arm may be easily thrown out by a slight pull upon the outwardly-projecting screw-threaded arm. The point of pivotal connection between the armature and the outwardly-projecting screw-threaded arm, and, consequently, the leverage of the armature upon the weighted arm, may be adjusted by loosening the screws which secure the disk at the inner end of the threaded arm and revolving the arm within the nut until the latter arrives at the desired distance from the fulcrum-bolt G', when the screws may again be tightened.

On account of the knuckle-joint and consequent combined vertically-sliding and laterally-swinging movement of the switch-tongue the contacts for the ends of the switch-tongue may be made very tight without, therefore, rendering the operation of the cut-out harder or less prompt.

The contact of the ends of the switch-tongue may be made so tight that the weight upon the weighted arm would be required to be many times as heavy as it is now required if the switch-tongue swung directly out instead of being first drawn down and thereupon swung out.

The weighted arm acquires some momentum in swinging out before it engages the cross-bolt of the short knuckle-arms H, and can thus overcome a considerable frictional resistance between the ends of the switch-tongue and the slotted contacts, pulling said ends downward with a quick jerk.

Other modes of applying the principle of my invention may be employed for the mode herein explained. Change may therefore be made as regards the mechanism herein set forth, provided the principles of construction respectively recited in the following claims are employed.

I therefore particularly point out and distinctly claim as my invention—

1. The combination of a contact, a pivoted arm, and a switch-tongue engaging the contact and pivotally connected to said pivoted arm at a point a distance from the axial line of the fulcrum of the same, substantially as set forth.

2. The combination, with a slotted contact, of a pivoted arm and a switch-tongue engaging the contact and pivotally connected to said pivoted arm at a point a distance from the axial line of the fulcrum of the latter, substantially as set forth.

3. The combination, with a contact having the sides of its contact-opening diverging and arranged within an electric circuit, of a pivoted arm, and a switch-tongue having a tapering end engaging the opening of the contact, arranged within the circuit and pivotally connected to said pivoted arm at a point a distance from the axial line of the fulcrum of the latter, so as to have its end first drawn



out of the contact and then swung out of the same when the pivoted arm is tilted, substantially as set forth.

4. In an automatic cut-out, the combination, 5 with a slotted contact and a coil, both in the circuit, and an armature for said coil, of a weighted pivoted arm connected to said armature to be tilted by the same, and a switch-tongue engaging the contact and in the circuit 10 and pivotally connected to the weighted arm at a point a distance from the axial line of the fulcrum of the said arm, substantially as set forth.

5. In an automatic cut-out, the combination, 15 with a slotted contact having the sides of its contact-opening diverging downward and ar-

ranged within the circuit, a coil within the circuit, and an armature for said coil, of a weighted pivoted arm connected to said armature to be tilted by the same, and a switch- 20 tongue in the circuit having a tapering end engaging the contact and pivotally connected to the weighted arm at a point a distance from the axial line of the fulcrum of said arm, substantially as set forth. 25

In testimony that I claim the foregoing to be my invention I have hereunto set my hand this 16th day of May, A. D. 1891.

WM. B. CLEVELAND.

Witnesses:

WM. SECHER,  
GEO. A. SNOW.