

No. 712,739.

Patented Nov. 4, 1902.

J. STRUTHERS.
ELECTRIC SPARK GENERATOR.

(Application filed Mar. 10, 1902.)

(No Model.)

Fig. 1.

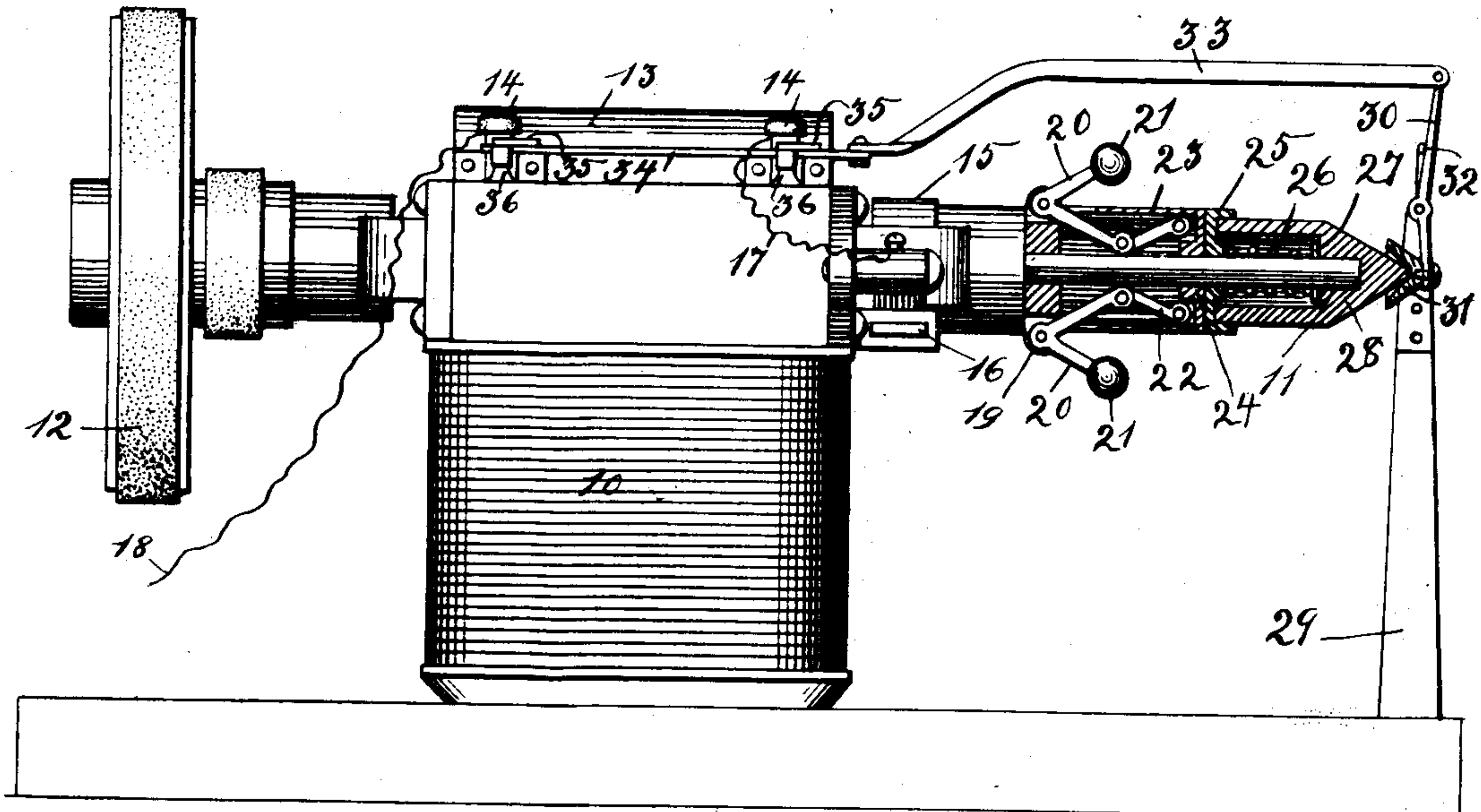
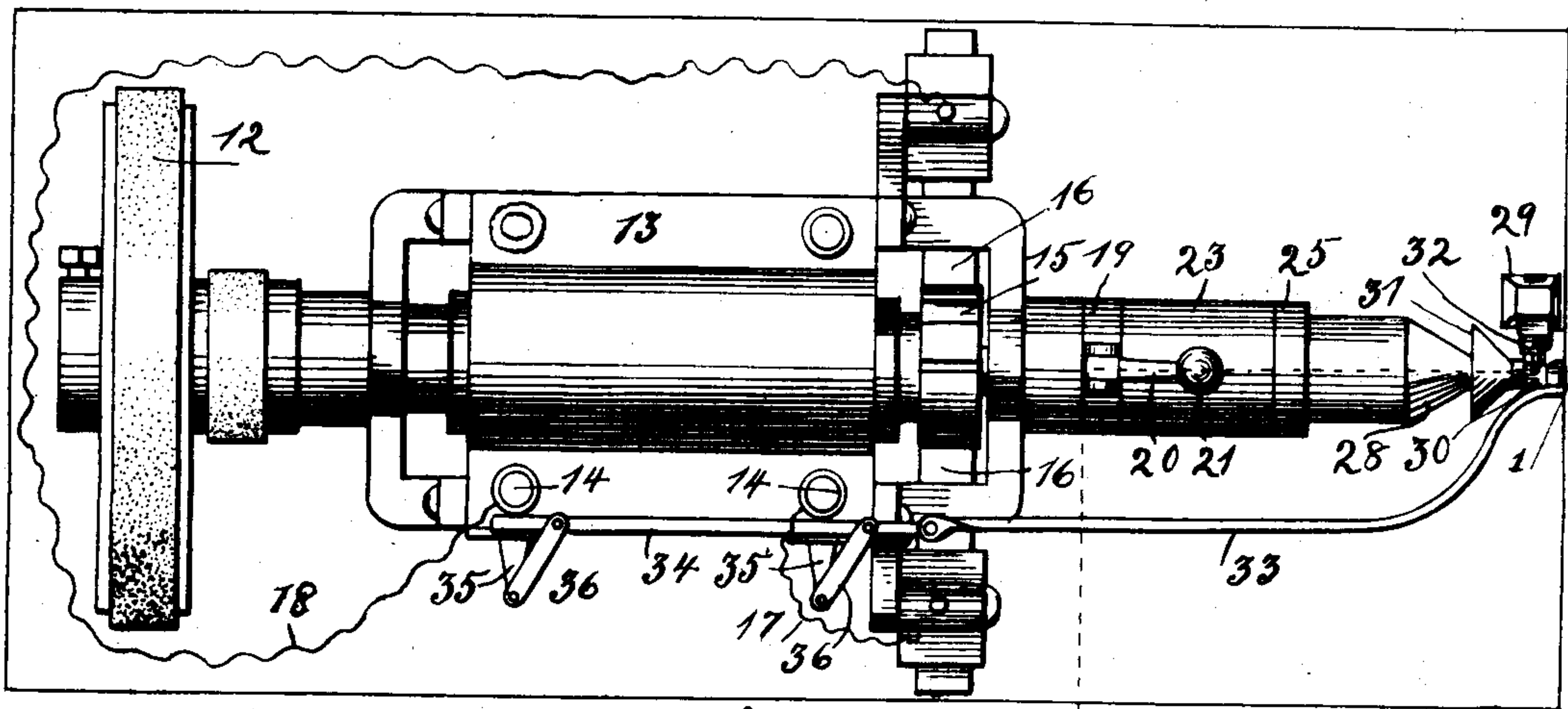


Fig. 2.



Witnesses
Charles F. Wilcox.
H. Mangor.

Inventor
Joshua Struthers
By Orwig & Lane, Attys.

UNITED STATES PATENT OFFICE.

JOSHUA STRUTHERS, OF DES MOINES, IOWA, ASSIGNOR TO J. F. CROSBY,
OF DES MOINES, IOWA.

ELECTRIC-SPARK GENERATOR.

SPECIFICATION forming part of Letters Patent No. 712,739, dated November 4, 1902.

Application filed March 10, 1902. Serial No. 97,422. (No model.)

To all whom it may concern:

Be it known that I, JOSHUA STRUTHERS, a citizen of the United States, residing at Des Moines, in the county of Polk and State of Iowa, have invented certain new and useful Improvements in Electric-Spark Generators, of which the following is a specification.

The objects of my invention are to provide a machine of this class of simple, durable, and inexpensive construction that may be used in combination with an explosive-engine to be driven by the engine and designed to generate a current of electricity sufficient for producing a comparatively long spark for igniting the explosive agent of the engine; and, more specifically, my object is to provide a generator of this class in which the field-coils are automatically cut out when, on account of too rapid rotation of the armature, the generator becomes liable to be burned out. In other words, my object is to provide a generator of this class with a centrifugal ball-governor and with means connected with the ball-governor for short-circuiting the field-coil when the speed of the armature becomes too great.

My invention consists in certain details in the construction, arrangement, and combination of the various parts of the device whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which—

Figure 1 shows a side elevation of the generator with a portion of the governing mechanism in section, as indicated by the dotted line 11 of Fig. 2. Fig. 2 shows a top or plan view of the complete generator.

Referring to the accompanying drawings, I have used the reference-numeral 10 to indicate the field-coil of the generator.

The reference-numeral 11 indicates the armature-shaft, having the friction-wheel 12 fixed thereto. On top of the field-coil is a plate 13, arched in its central portion, and mounted upon said plate are the binding-posts 14. Mounted upon the armature-shaft is the commutator 15, and connected with the machine-frame are the brushes 16, all of the ordinary construction. One of the binding-posts is connected with one of the brushes

by means of the conductor 17, and a conductor 18 leads from the opposite binding-post to a sparking-coil and is then returned to the opposite brush.

The numeral 19 indicates a collar fixed to the armature-shaft and having mounted therein the bell-crank levers 20, each having a ball 21 at one end and the other end projected inwardly toward the shaft, and pivoted to inner end of each of the bell-crank levers 20 is an arm 22, extended outwardly from the shaft. Rotatably mounted upon the shaft is a sleeve 23, having a head 24 at its end farthest from the collar 19, and said sleeve encircles the inner ends of the levers 20. By this arrangement it is obvious that when the balls are moved outwardly by centrifugal force the arms 22 will press against the head 24 and force it in a direction away from the machine-frame. Mounted on the shaft 11 in engagement with the end 24 is a plate 25, and an extensile coil-spring 26 is mounted upon the shaft 11, with one end in engagement with said plate 25 and the other end bearing against a pin 27 in the shaft, thereby normally holding the plate 25 to its limit of movement in a direction toward the machine-frame. I have mounted upon the end of the shaft 11 a cone-shaped block 28, having a hollow chamber designed to encircle the coil-spring 26. This cone is capable of sliding longitudinally upon the shaft 11. Obviously as the speed of the shaft 11 increases the arms 22 will operate to force the plate 25 against the pressure of the spring 26 to thereby move the cone 28 in a direction away from the machine-frame.

The numeral 29 indicates an upright having at its top a lever 30. On one arm of the lever 30 is a cone-shaped cup 31 in position to receive the end of the cone 28. A spring 32 is provided for normally holding the upper end of the lever 30 in a direction away from the machine-frame. Connected with the upper end of the lever 30 is a link 33, and this link is pivotally connected to a bar 34, which bar is slidingly mounted on top of the plate 13 adjacent to the binding-posts 14. At the side of the machine-frame adjacent to the binding-posts 14 are the brackets 35, and links 36 are pivoted to said brackets and to

the bar 34. These links are so arranged that when the bar is moved in a direction toward the friction-pulley of the machine it will be forced into contact with both binding-posts, 5 and when moved in the other direction it will move away from the binding-posts. The spring 32 is provided for normally holding the bar 34 out of contact with the binding-posts.

- 10 In practical use, and assuming the friction-wheel 12 to have been placed in contact with a driving-wheel of an explosive-engine running at ordinary speed, the current will be taken from one of the brushes and will pass 15 through the conductor 17 to one of the binding-posts 14 and then through the field-coil and from the other binding-post to the sparker of the engine and finally to the opposite brush. Assuming, however, that the speed of the engine becomes so great as to generate a current of electricity of such potential as to be liable to burn out the generator, it is obvious that the governor on the armature-shaft will operate to force the cone 28 outwardly from 25 the machine-frame, thereby sliding the bar 34 into position in contact with both binding-posts. This obviously will short-circuit the current through the bar 34, and thereby relieve the generator and avoid the possibility 30 of its burning out.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States therefor, is—

1. An improved electric-spark generator, 35 comprising in combination, a field-coil, an armature rotatably mounted in the field-coil, a commutator on the armature-shaft, brushes in engagement with the commutator, binding-posts mounted on the machine-frame and 40 electrically connected with the commutators, a metallic bar mounted on the machine-frame and capable of engaging both binding-posts at the same time, a centrifugal governor on the armature-shaft, and means whereby, when 45 the governor is thrown outwardly by centrifugal force, the bar will be moved into position in engagement with both binding-posts, for the purposes stated.

2. An improved, electric-spark generator, 50 comprising in combination, a field-coil, an armature-shaft rotatably mounted, an arma-

ture on the shaft, a friction-wheel on the shaft, a commutator on the shaft, brushes on the machine-frame, in engagement with the commutator, binding-posts on the machine-frame, means for electrically connecting the 55 binding-posts with the commutator-brushes, a metallic bar mounted on the machine-frame adjacent to the binding-posts, supports on the machine-frame, links connecting the supports 60 and said bar, whereby, when the bar is moved longitudinally the links will force the bar into engagement with the binding-posts, a centrifugal governor connected with the armature-shaft, and means operated by the cen- 65 trifugal governor for moving the said metallic bar into engagement with the binding-posts when the governor is going at high speed, for the purposes stated.

3. An improved electrical-spark generator, 70 comprising in combination, a field-coil, an armature-shaft rotatably mounted, an armature thereon, a friction-wheel on the armature-shaft, a commutator on the armature-shaft, brushes in engagement with the commutator 75 binding-posts on the machine-frame, electrically connected with the brushes, a metallic bar capable of movement to or from engagement with the brushes, a collar on the armature-shaft, bell-crank levers mounted on said 80 collar, and having weights at one end, and their other ends projected inwardly toward the shaft, arms pivotally connected with said ends, a plate slidingly mounted on the shaft to be actuated by said arms, a spring on the 85 shaft to move said plate in a direction toward the arms, a cone slidingly mounted on the shaft in engagement with said plate, a lever mounted on a stationary support, a cone-shaped cup adjacent to the end of said cone, 90 a lever for supporting the said cup, a link connected with said lever and with said sliding bar, and a yielding pressure device for normally holding the said lever in position where the sliding bar will be out of engage- 95 ment with the binding-posts, substantially as and for the purposes stated.

JOSHUA STRUTHERS.

Witnesses:

THOMAS G. ORWIG,
W. R. LANE.

It is hereby certified that Letters Patent No. 712,739, granted November 4, 1902, upon the application of Joshua Struthers, of Des Moines, Iowa, for an improvement in "Electric-Spark Generators," was erroneously issued to J. F. Crosby, as owner of the entire interest in said invention; that said Letters Patent should have been issued to the inventor *Joshua Struthers and J. F. Crosby, jointly*, said J. F. Crosby being the assignee of one-half interest only in said patent, as shown by the record of assignments in this office; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 9th day of December, A. D., 1902.

[SEAL.]

F. I. ALLEN,
Commissioner of Patents.