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IMPULSE GENERATOR

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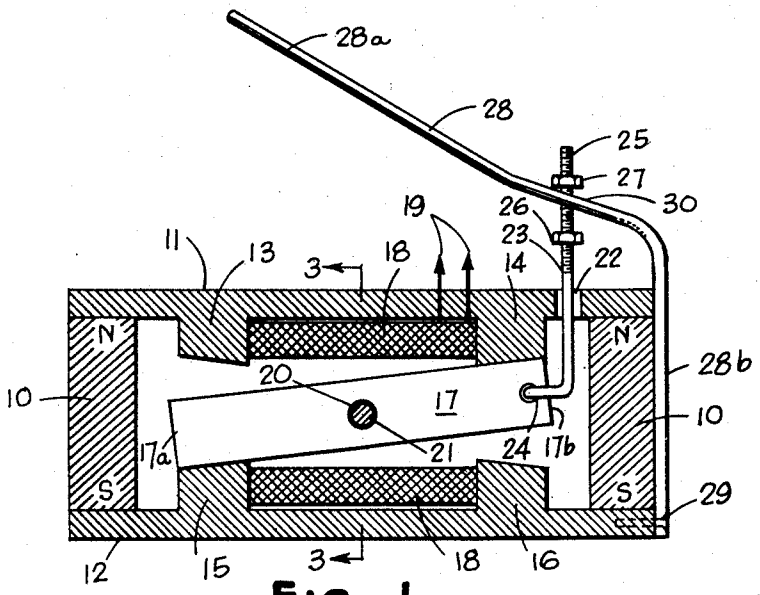

FIG. 1.

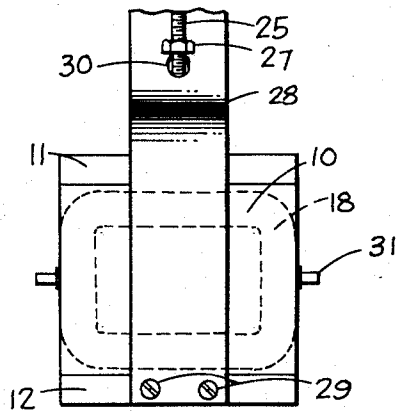

FIG. 2.

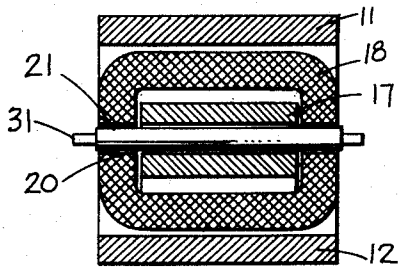

FIG. 3.

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IMPULSE GENERATOR

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5 Claims. (Cl. 310—15)

This invention relates generally to impulse generators which are employed to provide a relatively short-time pulse of electrical energy. The novel features of the present invention relate more particularly to an improved and simplified construction for effecting movement of the generator core as well as controlling this movement in a more precise manner than has been heretofore possible with present day conventional impulse generators.

Reference is made to applicant's co-pending application entitled "Impulse Generator," filed May 9, 1955 and assigned Serial Number 506,821, now Patent No. 2,784,327, for a general discussion of the principle of operation of implse generators as well as certain problems which are encountered.

The purpose of the present invention, as distinguished from the referenced co-pending application, is to provide a more simplified means of transmitting force to the core for urging movement of the core through the magnetic field and automatically effecting return of the core to its original position after the electrical impulse has been generated. Towards this end, the present invention relates to an improvement both as to the referred to application and applicant's co-pending application entitled "Impulse Generator," filed September 17, 1956, and assigned Serial Number 610,304, now Patent No. 2,832,902 wherein a requirement of means for returning the core to its original position either in the form of a return spring or a return lever is eliminated. A further improvement has been effected in providing a simple means of assuring symmetrical movement of the core throughout its path of travel in the magnetic field, whereby a maximum peak pulse is attained at a particular instant of time.

It is an object of the present invention, therefore, to provide an improved impulse generator of unusually simplified construction, which includes means for automatically returning the core to its original position after operation.

Another object of the present invention is to provide an improved impulse generator which will result in symmetrical movement of the core through the magnetic field during operation without the possibility of the creation of a secondary impulse peak.

A still further object of the present invention is to provide an impulse generator which may be inexpensively constructed with a minimum number of parts and yet which will give satisfactory maintenance-free service.

Generally, these and other objects of the present invention are attained by providing in an impulse generator a force transmitting member which has one portion secured to an end of the core. Spring means are employed, preferably a flat spring member, which has one portion either fixed to the impulse generator or fixed with respect to the impulse generator and another portion coupled to another part of the force transmitting member.

The spring means is so designed that a force is normally exerted biasing the force transmitting member in a direction tending to retain a core in its normal or inoperative position. The spring means either integrally includes or is provided with an extension whereby the extension may be actuated as a handle to urge the force transmitting member in another direction forcing the core towards its operated position. However, as soon as pressure is released from the extension or other connection to the spring means, the spring means will act to return the core, in view of its coupling to the force transmitting member, back to its original position.

A further improvement of the present invention is to preferably include in the impulse generator construction a pivot pin or a similar member positioned so as to extend perpendicularly through the core at a point equidistant from its ends. With such a construction, any movement effected at one end of the core results in an equal angular movement at the other end of the core.

A better understanding of the present invention will be had by reference to the attached drawings, illustrating a preferred embodiment, and in which:

Figure 1 is a cross section of the improved impulse generator before operation has been effected;

Figure 2 is an end view of the impulse generator taken in the direction of the arrows 2—2 of Figure 1; and,

Figure 3 is a sectional view taken in the direction of the arrows 3—3 of Figure 1.

Referring now to the drawings, there is shown in Figure 1 an impulse generator according to the present invention provided with permanent magnets **10** at either end thereof disposed between a top side bar **11** and a bottom side bar **12**. Projecting downwardly from an intermediate portion of the side bar **11** are poles **13** and **14**; similarly, poles **15** and **16** extend upwardly from an intermediate portion of the bottom side bar **12**.

A core **17** is positioned between the poles of the top side bar **11** and bottom side bar **12**. The core **17** is positioned such that its end **17***a* is adapted to move between poles **13** and **15**, and correspondingly, its end **17***b* is adapted to move between poles **14** and **16**. In Figure 1, the core **17** is shown disposed in its unoperated or first position in which the end **17***b* is in contact with the pole **14** and the end **17***a* in contact with the pole **15**.

Disposed around the core **17** in between the poles of the side bars **11** and **12** is a coil **18** having leads **19**. The leads **19** have been schematically shown as passing through the top side bar **11** for suitable connection to the particular load to be operated by the impulse generator.

As an important feature of the present invention, a transverse bore **20** is shown as extending through the core **17** and the coil **18**. The bore **20** is positioned at a point equidistant from the core ends **17***a* and **17***b*. Extending through the bore **20** is a pivot pin **21**, more clearly shown in the view of Figure 3, which is journaled in the bore **20** so as to act as a point of pivoting of the core **17** as it is actuated either to its second, operated position or back to its normal, first position.

The top side bar **11** is provided with a slot **22** through which extends a force transmitting member **23**. The force transmitting member **23** may be a rod of rigid construction, as shown, or may be provided with a given spring tension according to the particular design requirements of the impulse generator. The rod **23** has one end **24** firmly secured in the end **17***b* or the core **17**. Its other end **25** is threaded, and secured thereon are coupling means in the form of nuts **26** and **27**. In the usual construction, the nut **26** is fixed with respect to the rod **23** and the nut **27** may be adjustably positioned thereon according to the dimensional and operating requirements.

A spring means in the form of a flat spring **28** is shown having a free, upper portion **28***a* and a fixed lower portion **28***b*, the latter being secured with screws **29** to the bottom side bar **12**. Referring now to Figure 2, it may be seen that the spring **28** is provided with an aperture **30** defining the limits of portions **28***a* and **28***b* and through which the rod **23** passes, whereby the rod **23** is coupled to the spring means for a limited movement in view of the space nuts **26** and **27** secured thereon.

Referring now to Figure 3, it is seen that the pivot pin **21** may terminate in bearing surfaces **31**, for example, adapted to be journaled in a casing or the like surrounding the impulse generator of Figure 1, the casing not being shown in the drawings. In an alternate construction, the bearing surfaces **31** might be extended to have an arm or lever secured thereto such that movement of the core **17** could be effected directly by rotational movement of the pivot pin **21**. In such a construction, the spring **28** and force transmitting member **23** would not be required. With such a construction, it will be appreciated that the pivot pin **21** must be positioned through the core **17** with a tight fit such that the core **17** will rotate upon rotation of the pin **21**. The pin **21** has been shown spaced from the bore **20** in the drawings since in the preferred construction of Figure 1 it is not necessary that the pivot pin **21** be positioned tightly in the bore **20**.

The operation of the impulse generator will be apparent from the previous description. In Figure 1, the impulse generator is shown in its normal or first position. To effect its operation, it is merly necessary for a manual or mechanical force to be imposed on the free end or upper portion **28***a* of the spring **28** overcoming its biasing action so that it strikes the nut **26** to in turn tend to rotate the core **17** about the pivot point established by the pin **21**. An impulse will be generated in accordance with the principles heretofore disclosed in applicant's referred to co-pending applications. As a consequence of the employment of the pivot pin **21**, the angular movement of the core ends **17***a* and **17***b* will be exactly the same thereby limiting the possibility of creating a lagging or double impulse peak because of the core end **17***a* or the core end **17***b* coming in contact with their respective pole pieces at different instances of time.

It is to be noted that the shape of the spring **28**, in conjunction with its particular structural relationship with the rod **23** and the impulse generator as a whole, enables it to act uniquely as in integral actuating spring and return spring. Thus, when a downward force is imposed on the upper, free portion **28***a*, a tension will build up in this length (to the left of the rod **23** in Figure 1), after the spring has contacted the lower nut **26**, which will finally exert sufficient force to snap the

core **17** to its second, operated position. On the other hand, the portion **28***b* (to the right of the rod **23** in Figure 1) serves to effect the return of the core **17** to its normal, first position.

The improved impulse generator of the present application, therefore, results in a unit which may be more economically and simply constructed and yet which still permits automatic operation satisfactory for most applications. Although a preferred embodiment has been shown, it will be appreciated that certain modifications and changes may be made without departing from the spirit and scope of the invention.

What is claimed is:

1. In an impulse generator including a core movable from a first given position to a second given position: a force transmitting member having one portion thereof secured to an end of said core; spring means having one portion thereof fixed with respect to said impulse generator; coupling means retaining another portion of said spring means to another portion of said force transmitting member, said another portion of said spring means acting to bias said force transmitting member in a direction urging said core towards said first given position; and, said spring means including an extension thereof adaptable as a handle for actuating said force transmitting member in another direction to urge said core towards said second given position.

2. An apparatus according to claim 1, in which said spring means comprises a flat spring, and in which said one portion of said spring means is secured to said impulse generator.

3. An apparatus according to claim 2, in which said force transmitting member comprises a rod, and in which one end of said rod is rigidly secured to an end of said core.

4. An apparatus according to claim 3, in which said another portion of said spring is provided with an aperture of given area through which said rod may extend, and means provided on said rod for limiting movement of said spring in an axial direction with respect to said rod.

5. An apparatus according to claim 4, in which said means on said rod comprise two spaced nuts, at least one of said nuts being adjustably positioned thereon.

References Cited in the file of this patent

UNITED STATES PATENTS

1,635,935	Godefroy	July 12, 1927
1,985,357	Wallace	Dec. 25, 1934
2,135,843	Pye	Nov. 8, 1938
2,376,557	Severance	May 22, 1945
2,687,481	Petersen	Aug. 24, 1954