March 4, 1958 P. KRUPEN 2,825,863

ENERGIZER

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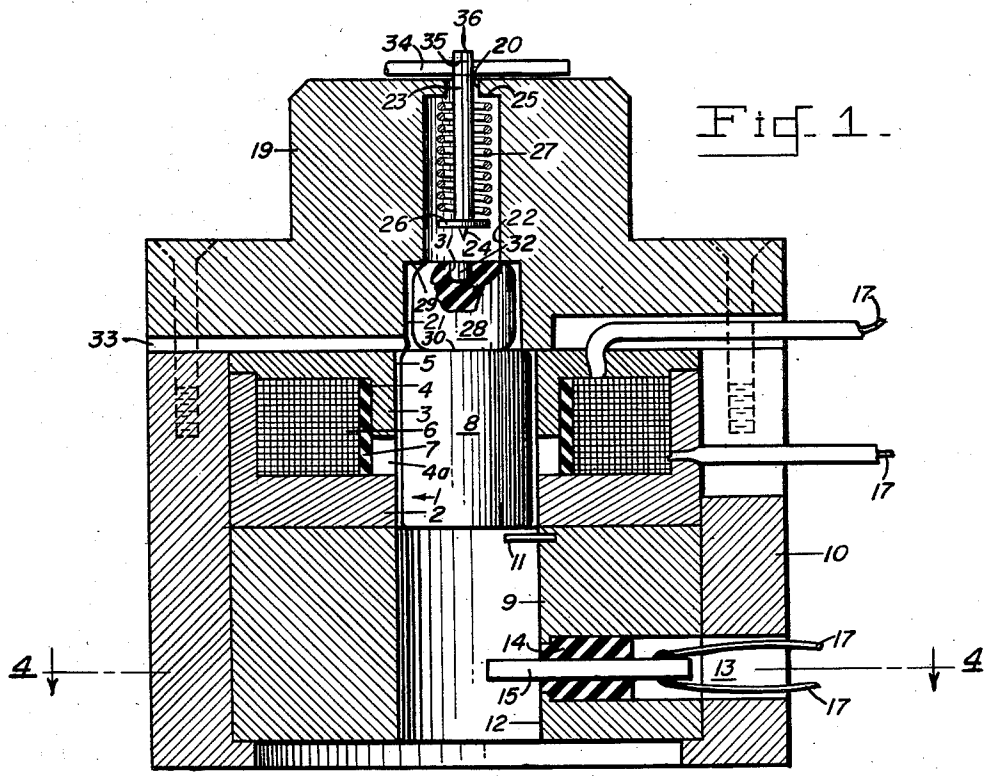


Fig. 1.

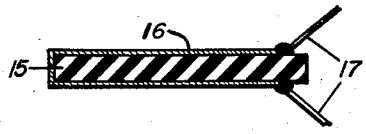


Fig. 2.

INVENTOR
Philip Krupen

BY W. E. Thibodeau & A. W. Dew
ATTORNEYS

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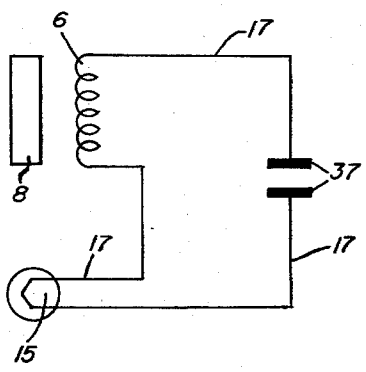


Fig. 3.

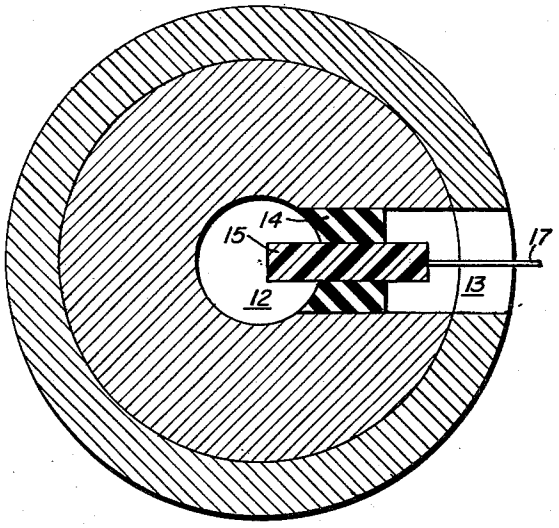


Fig. 4.

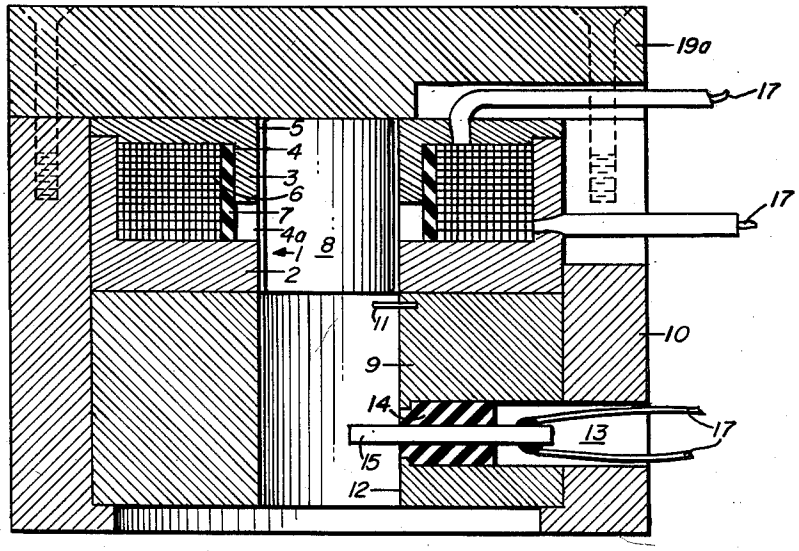


Fig. 5.

INVENTOR

Philip Krupen

BY

W. E. Shitoclean & A. W. Dew

ATTORNEY

United States Patent Office

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ENERGIZER

Philip Krupen, Washington, D. C.

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5 Claims. (Cl. 320—1)

(Granted under Title 35, U. S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment to me of any royalty thereon.

This invention relates to energy sources and particularly to an energizing device for transforming mechanical motion of translation into electrical energy.

One object of the invention is a novel device for producing an electrical voltage.

Another object of the invention is a means for storing electrical energy once produced.

A further object of the invention is a small device for producing disproportionately large voltages.

A still further object of the invention is an energizer employing an explosive element for motive power.

An additional object of the invention is an energizer employing the force of inertia for motive power.

The specific nature of the invention as well as other objects and advantages thereof will clearly appear from the following description and drawings in which:

Figure 1 is a longitudinal sectional view of the invention.

Figure 2 is a detailed sectional view of the frangible switch shown in Fig. 1.

Figure 3 is a schematic diagram of the electrical circuit of the invention.

Figure 4 is a cross-sectional view of the invention taken along line 4—4 of Fig. 1.

Figure 5 is a modification of the invention shown in Fig. 1.

A preferred embodiment of the invention is shown in Fig. 1 wherein a soft iron core indicated generally by numeral 1 comprises a lower member 2 and an upper member 3 for convenience of manufacture and assembly. Core 1 is formed with an annular recess 4 and a central aperture 5. The annular recess 4 receives a coil of wire 6 mounted on a bobbin 7. A permanent magnet 8 is releasably maintained within aperture 5 of core 1 by magnetic forces across the magnet resulting from the tendency of the system to maintain the magnetic circuit originating at the magnet 8, passing through the core 1, and returning to the magnet. An annular air gap 4*a* is provided for the purpose of helping to maintain the magnetic circuit. Core 1 rests on centrally apertured base 9, both members being housed within outer case 10. Shear pin 11 is affixed to base 9 and extend into aperture 12 of the base for the purpose of maintaining magnet 8 in place if the magnetic forces fail.

In a radially disposed opening 13 through base 9 and outer case 10 is an insulator 14 carrying frangible conductor or switch 15. The frangible switch consists of a ceramic core and a metallic coating 16, as shown in Fig. 2. Referring to Figs. 2 and 3, wire leads 17 connect coil 6 and switch 15 with each other and to capacitor 37.

Aperture 20 of cap 19, which is affixed to outer case 10, has large counterbore 21 and small counterbore 22. Firing pin 23 is positioned within aperture 20, the point 24 of which extends into counterbore 22. Concentric

with firing pin 23 and compressed between shoulder 25 of counterbore 22 and collar 26 of firing pin 23 is helical spring 27. Pusher 28 is positioned within counterbore 21 and is normally maintained between shoulder 29 of counterbore 21 and one surface 30 of magnet 8. Positioned within recess 31 of pusher 28 is explosive primer 32. Drilled passages 33 in cap 19 are for the purpose of permitting the escape of gases formed by the explosion of primer 32.

Firing pin 23 is releasably maintained in its normal position by pin 34 which is inserted into and removable from aperture 35 formed in the blunt end 36 of the said firing pin.

Upon setback or whenever it is desired that the energizer function, pin 34 is extracted from aperture 35 in firing pin 23. Spring 27 then drives the firing pin into explosive primer 32 to initiate that element. The reaction from the resulting explosion forces pusher 28 to drive magnet 8 downward, shearing shear pin 11. As magnet 8 moves away from core 1 an electrical voltage is induced in coil 6 which results in a charge being deposited upon capacitor 37.

Magnet 8 continues its travel downward to shear switch 15 and open the capacitor circuit, thereby trapping the charge upon capacitor 37. That charge can be removed from the capacitor at any time by connecting a utilizing means, not shown, across capacitor 37, Fig. 3.

A modification of the invention is shown in Fig. 5. The construction is similar to that shown in Fig. 1, the cap 19*a* replacing cap 19 of Fig. 1. Magnet 8 in this version of the invention is caused to move by inertia when the energizer is subjected to an acceleration, thereby inducing a voltage in coil 6 which charges capacitor 37. The charge is trapped upon capacitor 37 when magnet 8 shears switch 15 to open the capacitor circuit. That charge can be removed from the capacitor 37 as before by connecting the utilizing means across the capacitor.

It will be apparent that the embodiments shown are only exemplary and that various modifications can be made in construction and arrangement within the scope of the invention as defined in the appended claims.

I claim:

1. In an energizer having a coil, a magnet which is adapted for movement with respect to said coil so as to induce a charge within said coil, and capacitor means connected to said coil for collecting said charge, an improved frangible conductor means for trapping said charge in response to said movement of said magnet, said improved frangible conductor means comprising a non-conductive rod having one end projecting a short way into the path of said magnet from a single side, said end being adapted to be broken by said magnet, and two conductive areas coated on said rod meeting at said end and arranged so that the breaking of said end by said magnet causes said two conductive areas to become insulated from one another, said conductive areas being adapted to form a series connection between said coil and said capacitor means before said end is broken.

2. The invention in accordance with claim 1 wherein said two conductive areas are parallel conductive strips coated along opposite sides of said rod which fold over to meet at said end.

3. An energizer comprising in combination a soft iron core having an annular recess and an aperture formed therein, a coil of wire positioned within said annular recess and a permanent magnet slidably positioned within said aperture, means for driving said magnet from said aperture and from the influence of said core and coil in order to induce a charge within said coil, capacitor means for collecting said charge, and frangible conductor means for trapping said charge, said frangible conductor means comprising a non-conductive rod having one end project-

ing a short way into the path of said magnet from a single side, said end being adapted to be broken by said magnet, and two conductive areas coated on said rod meeting at said end and arranged so that the breaking of said end by said magnet causes said two conductive areas to become insulated from one another, said conductive areas being adapted to form a series connection between said coil and said capacitor means before said end is broken.

4. The invention in accordance with claim 3 wherein said two conductive areas are parallel conductive strips coated along opposite sides of said rod which fold over to meet at said end.

5. The invention in accordance with claim 3 wherein said means for driving said magnet comprises an explosive primer and primer initiation means.

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