(No Model.) 2 Sheets—Sheet 1.

W. HENRY.

INFLUENCE GENERATOR OF ELECTRICITY.

No. 479,941. Patented Aug. 2, 1892.

Fig. 1

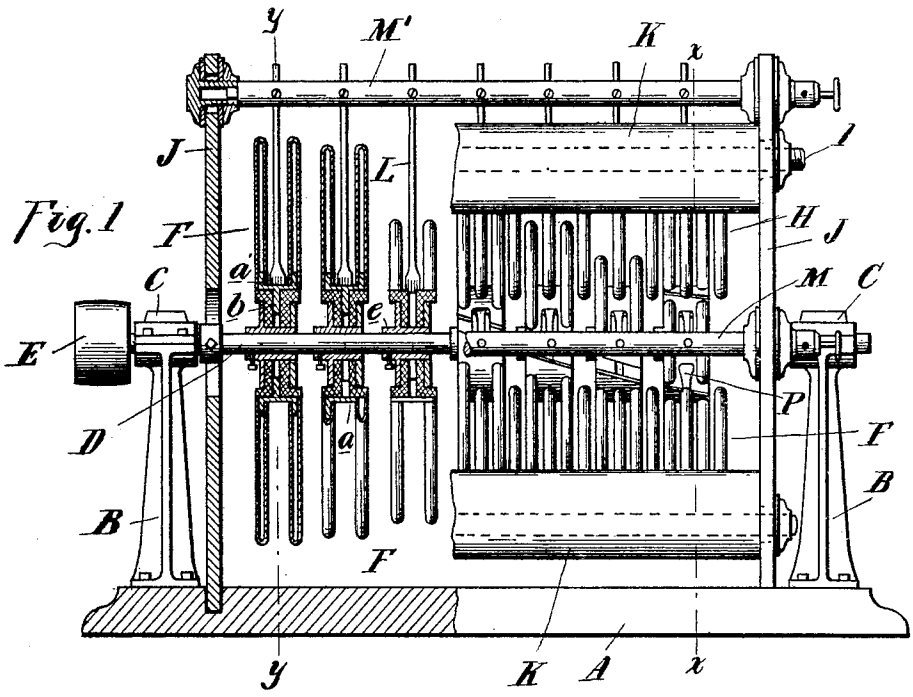
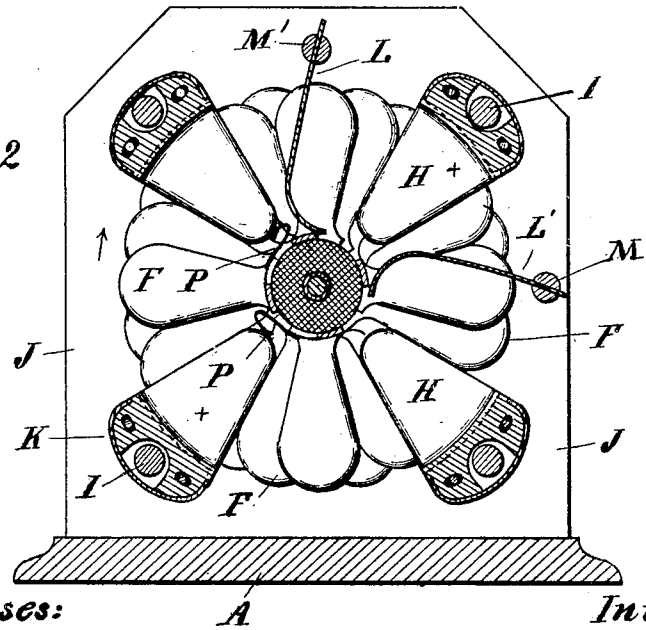


Fig. 2



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(No Model.) 2 Sheets—Sheet 2.

W. HENRY.

INFLUENCE GENERATOR OF ELECTRICITY.

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Fig. 3

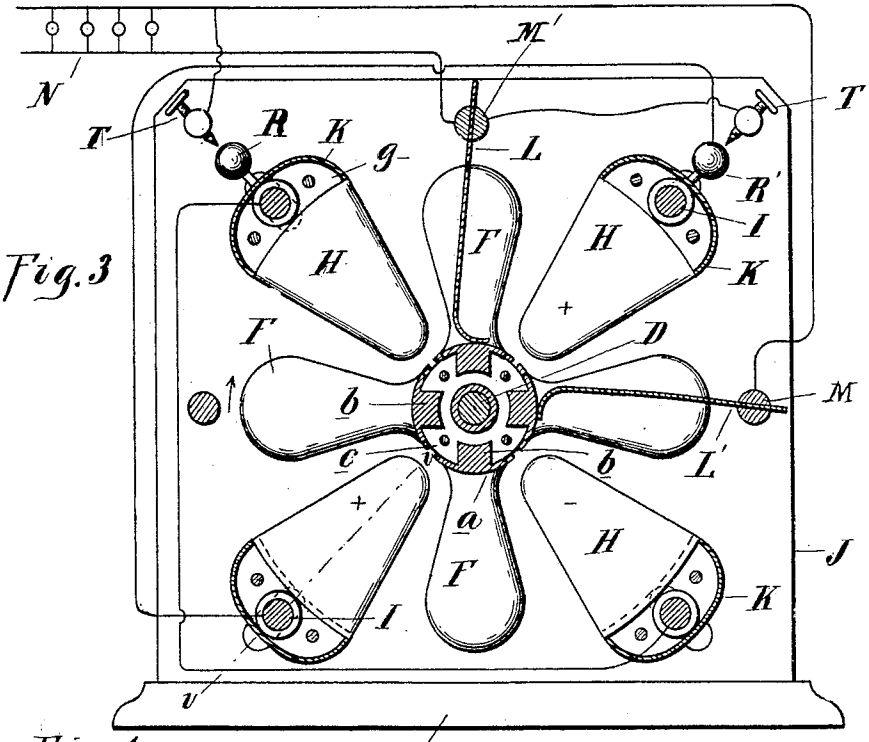


Fig. 4

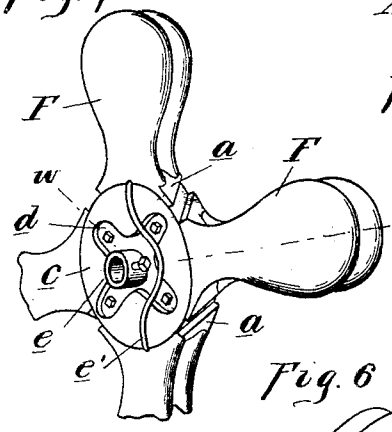


Fig. 5

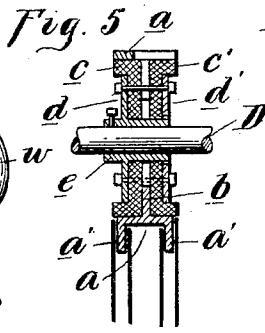


Fig. 8

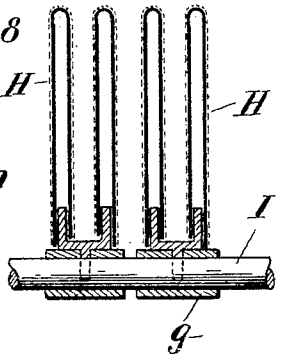


Fig. 6

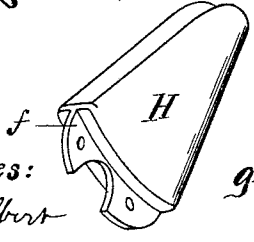
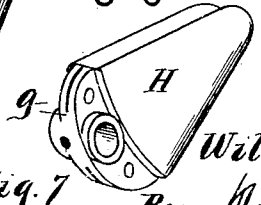


Fig. 7



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UNITED STATES PATENT OFFICE.

WILLIAM HENRY, OF DETROIT, MICHIGAN.

INFLUENCE-GENERATOR OF ELECTRICITY.

SPECIFICATION forming part of Letters Patent No. 479,941, dated August 2, 1892.

Application filed May 29, 1891. Serial No. 394,519. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HENRY, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Electrical Generators, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to new and useful improvements in electrical generators; and the invention consists in the peculiar construction, arrangement, and combination of different parts whereby dynamic electricity in any desired form of current is generated by means of statical induction, all as more fully hereinafter described.

In the drawings, Figure 1 is a side elevation of my improved generator, partly in vertical section. Fig. 2 is a section on line *x x*, Fig. 1, looking toward the left of the machine. Fig. 3 is a similar cross-section on line *y y*, looking toward the right of the machine. Fig. 4 is a detached perspective view of one of the sector-wheels of the revolving armature. Fig. 5 is a section on line *w w*, Fig. 4. Fig. 6 is a detached perspective view of one of the inducing-sectors. Fig. 7 is a detached perspective view showing the means of clamping the inducing-sectors in position. Fig. 8 is a cross-section on line *v v* in Fig. 3.

A is a bed-plate.

B are supporting-standards.

C are suitable bearings, in which the shaft D of the armature is journaled, and E is a pulley for revolving it.

The armature has a series of insulated metallic sectors F, radially secured in planes at right angles to the armature-shaft, there being one or more in each plane, the drawings showing four of such sectors in each plane placed equidistant apart. In the preferred construction (shown in detail in Figs. 4 and 5) these sectors are united in pairs at the base by a segmental circular bridge *a*, which has a stem *b* for securing them into the hub. Each sector is preferably made of suitably-thick sheet metal of a kind best adapted for inductive purposes and is secured upon a spoke *a'*, which unites it firmly to the bridge *a*. The sectors are made as light as possible, of equal thickness throughout, and finished smoothly with rounding edges and corners.

The hub consists of two disks *c c'* of insulating material, between which the stems *b* are removably and adjustably clamped in any suitable manner, as by means of the clamping-spiders *d d'*, one of which is provided with a bushing *e*, which secures the hub upon the armature-shaft. The bridges *a* fit the periphery of the hub and form a commutator for taking off direct currents, as more fully hereinafter described. Four pairs of sectors thus form a wheel, of which the two opposite pairs of sectors are brought in electric connection with each other, such as by means of metallic strips *e'*, one on each side, which pass over on the sides of the hub out of contact with other metallic parts. The armature consists of any desired number of these sector-wheels adjustably secured upon the shaft, so that they may be grouped in different ways. This grouping depends upon the kind of electrical effect to be desired. If a direct uniform current is desired to be obtained, I arrange them so that the sectors or pairs of sectors are grouped spirally around the shaft, as shown in the drawings, whereby in an end projection of the armature the sectors are equally distributed around the shaft, or substantially so. This armature revolves within a stationary electric field formed by inductors H, which are secured in position from the frame in any suitable manner, such as by means of longitudinal bars I, which are secured between two vertical standards J of glass (covered with shellac) or of some other suitable insulating material. The inductors H are of similar form and construction as the armature-sectors and arranged in planes at right angles to the armature-shaft equidistant between the armature-sectors and in longitudinal line with each other, so that in an end projection the sectors of one plane cover all the sectors in the other planes. The inductors H are preferably constructed in pairs, substantially in the manner described for the sectors of the armature, and provided with a stem *f* at the base, by means of which they are adjustably secured to apertured holding-clamps *g*, which are secured by set-screws or otherwise upon the bars I, the latter being preferably secured detachably and adjustably, such

as after the manner of securing the bars M M′, as shown in Fig. 1. The inductors H may thus be individually as well as collectively adjusted, it being necessary for the proper operation of the machine that the planes in which the sectors of the armature and field respectively are secured should be exactly parallel to each other and equidistant apart, alternating with each other in the longitudinal direction of the shaft, and that the inductive phases of all the sectors of each sector-wheel in relation to the adjacent inducing-sectors should be precisely the same. The inductors H are rounded off at the inner end, as shown, and project within a suitable distance toward the hub of the armature. All the edges and corners are rounded off, and the outer ends of each longitudinal series of inductors are covered over or screened by a metallic plate K, extending the whole length, all external surfaces being smoothly finished, and the diametrically-opposite series of inductors (which are to be of like electrification) are electrically connected, as shown, and to reduce the loss from electric radiation the external surfaces of the inductors are coated or covered with some insulating material.

The segmental circular bridges *a* between each pair of armature-sectors form a direct current-commutator for each sector-wheel, and these commutators are provided with two sets of brushes L and L′, which are arranged in the open spaces between the inductors and adjustably secured in any suitable manner to the longitudinal bars M M′, which are in turn secured adjustably and removably to the heads J by passing through enlarged apertures therein or in any other suitable manner. Each set of brushes is electrically connected by means of the longitudinal bars M M′ or in any other suitable manner, and binding-posts are provided in metallic connection with the bars M M′, to which the terminals of an exterior work-circuit N are secured and in which the translating or transforming devices are placed.

The inducing-sectors are preferably kept electrified from an exterior source, (not shown,) and this may be a statical generator of any known construction and driven by suitable means adapted to regulate the speed thereof; but, if desired, the machine may be made to maintain the electrification of the inductors while in operation in the following manner: One or more of the sector-wheels, preferably those at one or both ends of the shaft, may be provided with commutator-contacts of lesser length than the commutator-contacts of the other sector-wheels, as shown in Fig. 2, and in addition two brushes or traveling contacts P P′ are secured to these armature-sectors.

In practice the machine, being constructed as shown and described, is intended to operate as follows: The sectors H are electrified by being connected to a suitable static generator to form alternate positive and negative statical inductors. Thus when there are four sectors in each plane there will be two positive and two negative inductors, which are respectively diametrically opposite each other, as indicated by the signs in Figs. 2 and 3. Starting from the position shown in Figs 2 and 3, (in which the armature-sectors are midway between the inducing-sectors with the armature rotating in the direction of the arrow,) it will be seen that two of the armature-sectors are approaching positively-electrified inductors and two are approaching negative inductors. As the armature-sectors rovolve in planes parallel with and in close proximity to the inducing-sectors, the armature-sectors become polarized during their approach; but as the armature-sectors are electrically connected by the circuit N through the brushes L and L′, as shown, a flow of electricity will take place through the circuit N—to wit, positive electricity will flow out of the armature-sectors approaching the positive inductors and at the same time flow into the armature-sectors approaching the negative inductors and become bound therein. As soon as the armature-sectors begin to recede from the inductors just approached the positive electricity that had become bound is now set free and flows through the circuit N into the sectors that became negative while approaching and becomes bound therein; but as the armature-sectors also change contact at the same instant with the terminal brushes of the exterior circuit the current will flow in the same direction exteriorly as the armature-sectors now approach inductors of opposite electrification and the current will continue to flow (without any change of contact with the brushes) until the sectors have fully approached the inductors toward which they are moving. Thus while half of the armature-sectors F are passing from a positive inductor to the next negative inductor they will receive positive electricity from the terminal brush of the external circuit, with which they are in electrical contact, and at the same time the other half of the armature-sectors will be discharging positive electricity into the other terminal brush of the external circuit while they are passing from a negative inductor to the next positive inductor. As the armature-sectors do not approach to or withdraw from the inducing-sectors simultaneously on account of the spiral arrangement of the sectors F, the flow of electricity through the circuit N is made practically uniform and continuous and will produce effects which can be utilized by translating or transforming devices the same as a direct current generated by magnetic induction or by a galvanic battery.

If the machine is made to self-maintain the electrification of the inductors after the manner described, the armature-sectors having the shortened contacts, as shown in Fig. 2, have their electrifications maintained by breaking contact with the brushes L and L′

a little before the point at which they pass the inductors by which they have been electrified, and when midway between the inductors are, by the brushes P and P′, brought in electrical connection with the inductors, toward which they approach. Thus their maintained electrifications will be communicated to the inductors.

By the peculiar construction and arrangement of the armature and field sectors loss from internal discharge is avoided, which in this class of machines is a point of the utmost importance. It is also a matter of importance to adjust the sectors in their proper relation to each other, and this adjustment can be effected in my construction, which also affords great facility for repairing or renewing any defective part without dismounting the machine.

Instead of electrically connecting the opposite pairs of armature-sectors four sets of brushes may be employed, and it will also be understood that it is not necessary to construct the sectors in pairs. By constructing in this manner greater facility is obtained for securing them firmly in position. I, however, do not limit myself to any specific construction.

To prevent overcharging, a suitable governor may be provided, such as shown in the drawings, in which R R′ are two balls electrically connected to the positive and negative inductors, respectively, and metallic points T are arranged in adjustable proximity to these balls. The points T may be either grounded or connected by a suitable conductor or connected to the line-wire, as shown in the drawings. If the fields then become overcharged, a discharge will take place between the balls and the adjacent points, and thus reduce the charge of the fields. By adjusting the inducing-sectors inwardly, so as to project more or less between the armature-sectors, or by adjusting the points T from or toward the balls R R′ of the governor the intensity or quality of the current may be increased or decreased, while the quantity may be regulated by regulating the speed of the armature.

From this description the scope of my invention will be clearly understood to comprise, broadly, an electrical generator in which dynamic-current effects are produced in a work circuit or conductor by making said conductor a medium through which electric impulses of high frequency are transmitted, said electric impulses being produced by means of statical induction between two groups of metallic bodies, one group of which forms an electrified field of alternate positive and negative statical inductors, while the other group moves in inductive proximity thereto.

What I claim as my invention is—

1. In an electric generator, the combination of two groups of insulated metallic bodies, one forming a statically-electrified field of positive and negative inductors and the other group adapted to become polarized at intervals by moving in inductive relation to said inductors, and an exterior work-circuit having connecting devices electrically connecting the induced bodies receding from a negative inductor and approaching to a positive inductor, with the induced bodies receding from a positive inductor and approaching to a negative inductor during their polarizations, substantially as described.

2. In an electric generator, the combination of two groups of insulated metallic sectors, one statically electrified to form positive and negative inductors and the other adapted to move in inductive relation thereto, the sectors of the two groups being arranged in relatively different inductive proximity to each other, whereby polarization takes place in the induced sectors at different moments of time, substantially as described.

3. The combination, in an electric generator, of two groups of insulated metallic sectors arranged radially around a common axis, one adapted to form a statically-electrified field of positive and negative electrification and the other adapted to revolve within said field, the two groups of sectors being arranged in alternating planes parallel with each other and equidistant apart and with portions of the sectors of the two groups in relative different inductive proximity to each other, a commutator and brushes for each portion of moving sectors having the same relative inductive proximity to the inducing-sectors and forming the positive and negative poles thereof during their phases of polarization by the inducing-sectors, and an exterior circuit electrically connecting all the brushes, substantially as described.

4. In an electrical generator, the combination of a group of insulated metallic sectors arranged radially around a central axis and adapted to form a stationary electrified field of positive and negative inductors, an armature arranged to revolve within said field and composed of a shaft, and a series of sector-wheels adjustably grouped upon said shaft and consisting of an insulating-hub and metallic sectors radially secured thereto in planes at right angles to the shaft, substantially as described.

5. In an electrical generator, the combination of a group of insulated metallic sectors arranged radially around a central axis and adapted to form a statically-electrified field of positive and negative inductors, an armature adapted to revolve within said field and composed of a group of like sectors secured to insulating-hubs upon the shaft of said armature and forming sector-wheels adapted to be independently adjusted upon said shaft, and commutators, one for each sector-wheel, formed upon the hub of each sector-wheel, substantially as described.

6. In an electrical generator, the combination of a group of stationary inducing-sectors of positive and negative statical electrification,

a group of movable sectors secured to a revolving shaft in alternating planes between said stationary sectors, commutator and brushes forming the positive and negative poles of the movable sectors during their phases of polarizations, an exterior work-circuit connecting such poles, and a governor for regulating the inductive influence of the inducing-sectors, substantially as described.

7. In an electrical generator, the combination of stationary inducing-sectors of positive and negative statical electrification, movable sectors secured by insulating-hubs to a revolving shaft and forming sector-wheels spirally grouped upon said shaft in inductive relation between the stationary sectors, a commutator and brushes for each sector-wheel and forming the positive and negative poles thereof at coincident phases of polarization, an exterior work-circuit connecting such poles, and a governor for regulating the inductive influence of the stationary sectors, substantially as described.

8. In an electrical generator, the combination of stationary sectors of positive and negative statical electrification, movable sectors secured to a revolving shaft in inductive relation between the stationary sectors, connecting devices whereby the differently-induced movable sectors are electrically united during coincident phases of polarization, and connecting devices between a portion of the stationary and movable sectors for maintaining the electrification of the inducing-sectors, substantially as described.

9. In an electrical generator, the combination of the revolving shaft, the sector-wheels adjustably secured upon said shaft, a commutator for each sector-wheel, a pair of brushes for each commutator, an exterior work-circuit connecting all the brushes, stationary sectors radially and adjustably secured in inductive proximity between the sector-wheels, and a governor for regulating the inductive influence in the stationary sectors, said governor being connected into an exterior circuit, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM HENRY.

Witnesses:
M. B. O'DOGHERTY,
N. L. LINDOP.