(No Model.)

2 Sheets—Sheet 1.

A. L. PARCELLE.

DYNAMO ELECTRIC MACHINE.

No. 563,940. Patented July 14, 1896.

Fig. 2.

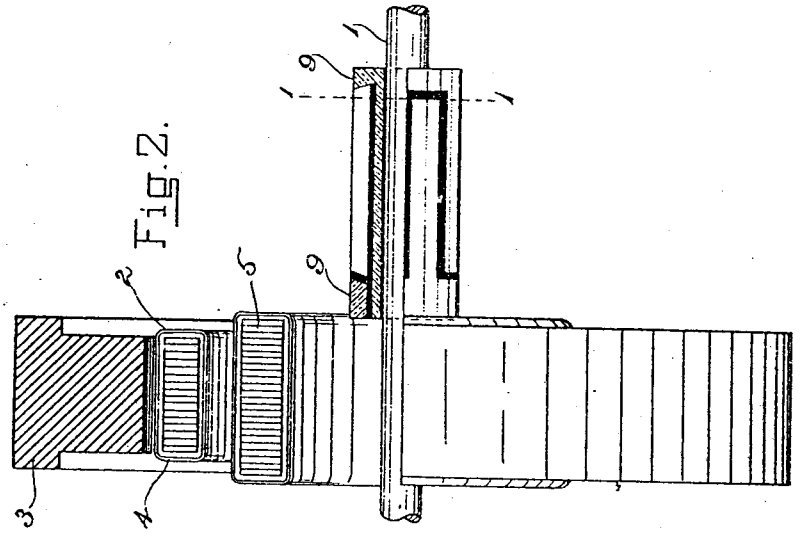
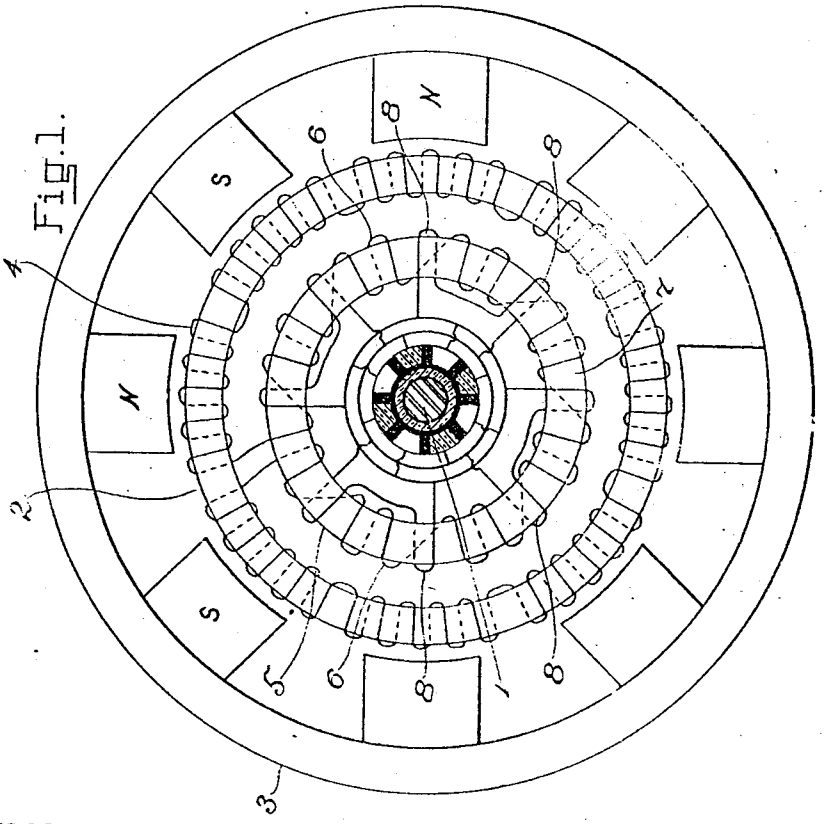


Fig. 1.



Witnesses
Oscar F. Hill
Alice H. Morrison

Inventor:
A. L. Parcelle
by Macleod Calver & Randall
Attorneys.

(No Model.) 2 Sheets—Sheet 2.

A. L. PARCELLE.

DYNAMO ELECTRIC MACHINE.

No. 563,940. Patented July 14, 1896.

Fig. 4.

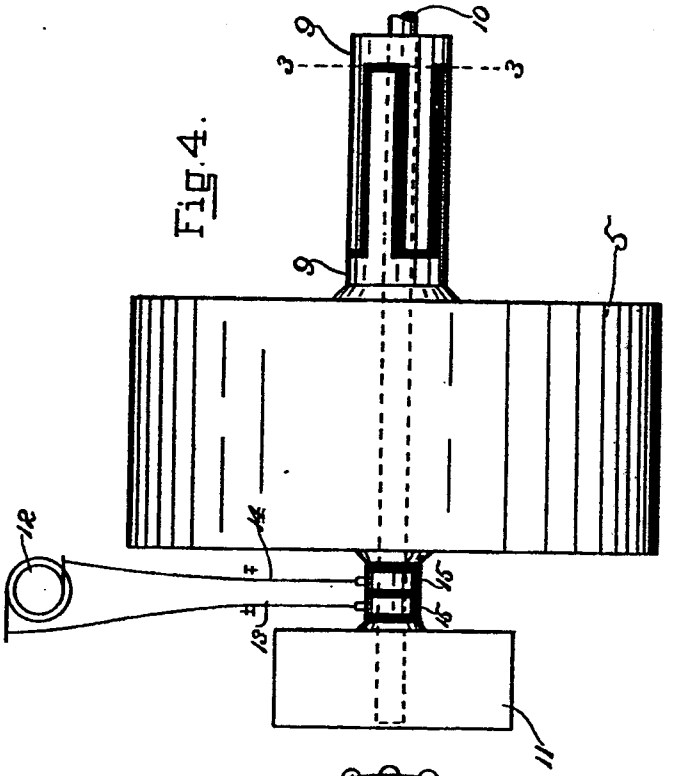
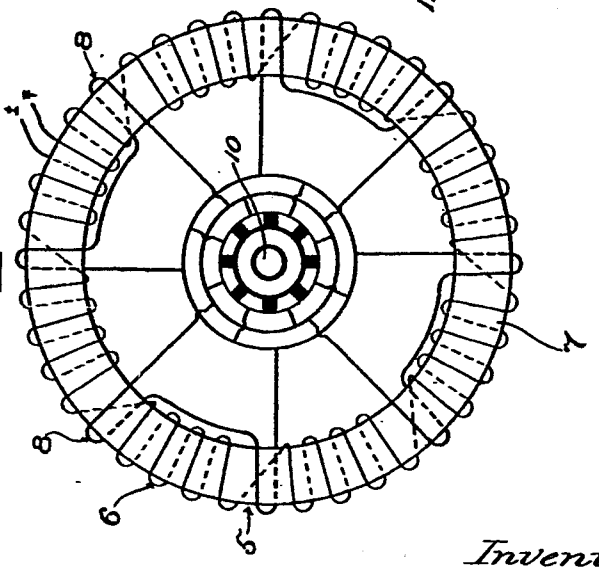


Fig. 3.



Witnesses.
Oscar F. Hill
Alice H. Morrison

Inventor.
A. L. Parcelle
by Macleod Calver & Rundall.
Attorneys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ALBERT L. PARCELLE, OF BOSTON, MASSACHUSETTS.

DYNAMO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 563,940, dated July 14, 1896.

Application filed January 7, 1896. Serial No. 574,590. (No model.)

To all whom it may concern:

Be it known that I, ALBERT L. PARCELLE, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Dynamo-Electric Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

The object of the invention is to provide simple and practical means for the production, advantageously and economically, of unidirectional wave-currents, that is to say, unidirectional currents which are characterized by waves of definite length and perceptible effect, the said waves consisting each of a rise and fall in the electromotive force.

The invention will be described first with reference to the accompanying drawings, in which are illustrated the best embodiments thereof which have been devised by me, after which the distinguishing characteristics thereof will be pointed out more particularly, and distinctly defined in the claim at the close of this specification.

Figure 1 of the drawings illustrates one form of apparatus embodying the invention, the parts being shown mainly in side elevation, but with the commutator and shaft in vertical transverse section on line 1 1 of Fig. 2. Fig. 2 is a view of the same chiefly in front elevation, but with the upper portion in vertical section. Fig. 3 is a view similar to Fig. 1, but showing the transformer and commutator pertaining to another form of apparatus embodying the invention. Fig. 4 is a view in front elevation showing the latter form of apparatus.

Reference will be had first to Figs. 1 and 2. In the said figures, 1 is the rotating armature-shaft. 2 is the armature, the latter being in practice connected with the shaft 1 to cause the armature and shaft to rotate in unison with each other by supports which are applied to the said shaft, but which it is unnecessary to illustrate, inasmuch as they may be of any known or approved character. 3 is a fixed field, it having in the present instance eight poles, as shown clearly in Fig. 1. 4 is the winding of the armature 2, it having eight coils or groups of convolutions, one for each pole of the field. The said coils or groups of convolutions are wound alternately in opposite directions, and are connected in series, as shown clearly in Fig. 1. 5 is a transformer which, in accordance with my present invention, is arranged to rotate in unison with the armature 2, it having, in the form of apparatus which is represented in Figs. 1 and 2, supports, (not necessary to be shown,) which connect it with the armature-shaft 1. 6 6 are the primary coils of the transformer, they being in series upon the core 7 and being wound all in one direction. The coils 6 6 are in series with the coils of the armature 2. 8 8 are the secondary coils of the transformer. 9 9 designate the halves of a two-part commutator, with which halves, respectively, the respective terminals of the secondary coils 8 8 are connected. By connecting the secondary coils in multiple with the commutator-halves 9 9, as shown, I avoid the employment of large wire in the secondary coils, such as the large volume of the transformed current would render it necessary to use if the secondary coils were connected in series. As shown, the said secondary coils are arranged in pairs, which are connected in multiple with the said commutator-halves, this being indicated clearly in Fig. 1.

The apparatus which has been described with reference to Figs. 1 and 2 is characterized by possessing a multipolar field of constant polarity, a ring-armature having the coils thereof wound in alternate directions and connected in series, and a transformer-ring mounted concentrically with the armature and turning in unison with the latter; and by having the primary coils of the transformer in series with the armature-coils and the secondary coils connected to a two-part commutator, each part of the said commutator having one-half as many lugs as there are poles in the multipolar field. The result of the operation of the said apparatus will be the generation of an alternating current through the interaction of the multipolar field and the ring-armature; and by means of the transformer and two-part commutator this alternating current will be transformed into a unidirectional wave-current, that is to say, a unidirectional current which is character-

ized by waves of definite length and perceptible effect, the said waves consisting each of a rise and fall in the electromotive force. While it is preferable that the secondary coils should consist, as hereinabove stated, of coils in multiple, the same may be, if desired, composed of coils in series. I have shown herein a two-part commutator made in halves provided with interlocking spurs or lugs, the latter being integral with the hubs pertaining to such halves. Any known or approved equivalent of this construction capable of securing the same results in operation may be substituted.

One of the main features of the invention is the fact that the transformer is arranged to rotate in synchronism with the alternating-current generator. In the form of apparatus which has been described with reference to Figs. 1 and 2, the armature of the alternating-current generator and the transformer are made fast upon the same rotating shaft. It is not essential that in all embodiments of the invention the alternating-current generator and rotatory transformer be mounted upon one and the same shaft. The requisite is that they should be synchronous in their working.

Figs. 3 and 4 show an apparatus which has been contrived by me, and which embodies the essentials of my invention, but in which the alternating-current generator is located in one place and the rotatory transformer in another. In the said apparatus of Figs. 3 and 4, I employ the same rotatory transformer that is shown in Figs. 1 and 2 and described in connection with the said figures, and the same two-part commutator, both of these devices being fixed upon a rotating shaft 10, which takes the place of the shaft 1 of Figs. 1 and 2.

In Figs. 3 and 4 the parts of the transformer and commutator are designated by the same numerals of reference as in Figs. 1 and 2.

In Fig. 4, 11 is a synchronous motor which is connected with the shaft 10, so as to rotate the same. At 12 is indicated the alternating-current generator, at 13 14 the wires leading from the same to the improved apparatus, and at 15 15 rings mounted on the shaft 10, which rings take the current from the said conducting-wires 13 14, and from which it passes to the synchronous motor and transformer. The synchronous motor occasions rotation of the transformer which is synchronous with that of the alternating-current generator and the same results follow and are secured by the use of this form of apparatus that are secured by the form which is represented in Figs. 1 and 2.

My improved apparatus is fitted especially to meet the requirements of those uses which call for large volumes of current, for example, electrolytic and smelting work. It is difficult, and involves quite serious loss, to take an alternating current of large horse-power and convert it into a direct current by means of a transformer of the kind or kinds at present in use.

I claim as my invention—

The combination with an alternating-current generator, of a synchronous rotary transformer, and a two-part commutator which is connected to the secondary of the said transformer, substantially as described.

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

ALBERT L. PARCELLE.

Witnesses:
CHAS. F. RANDALL,
ROBERT WALLACE.