2 Sheets—Sheet 1.

H. WILDE.

Magneto Electric Machine.

No. 59,738.

Patented Nov. 13, 1866.

Fig. 1.

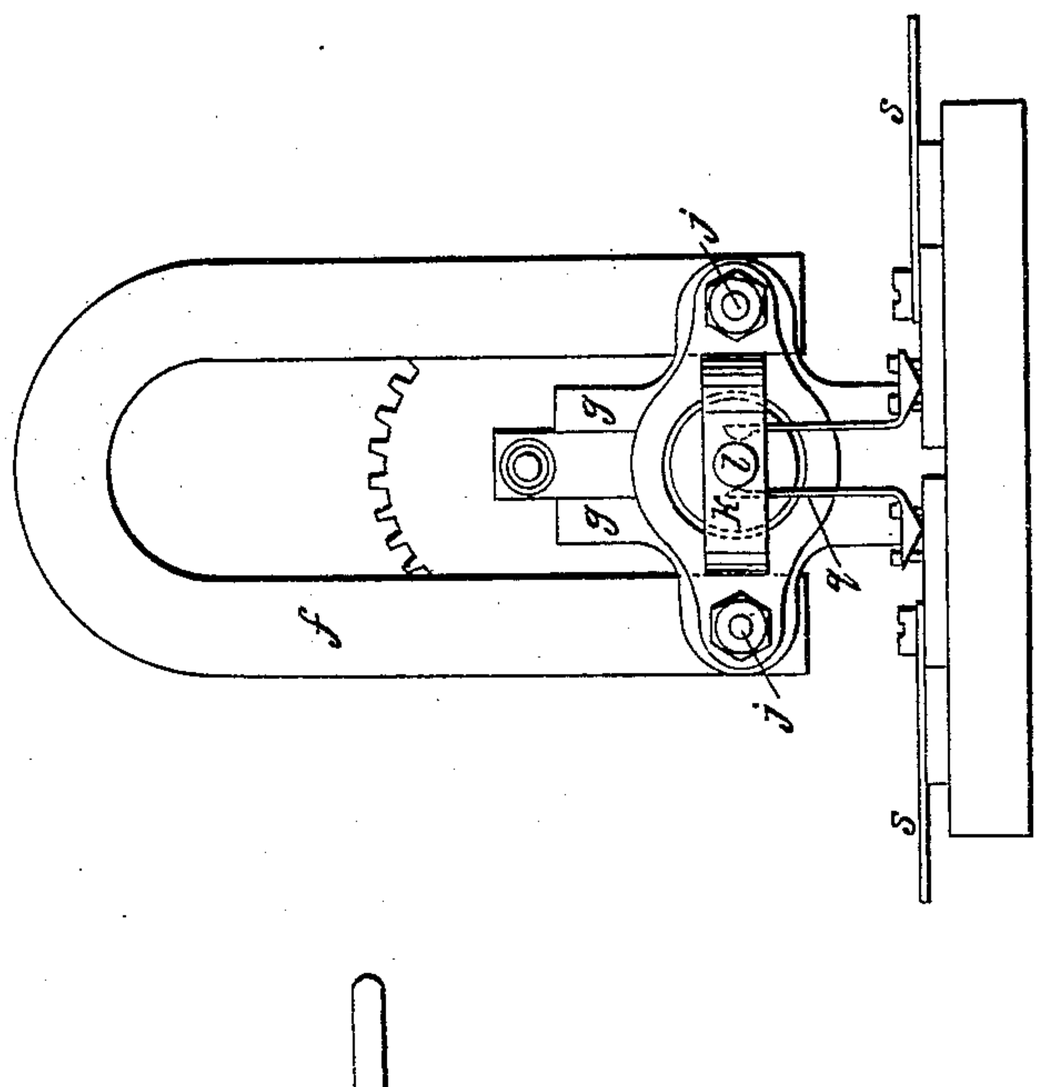
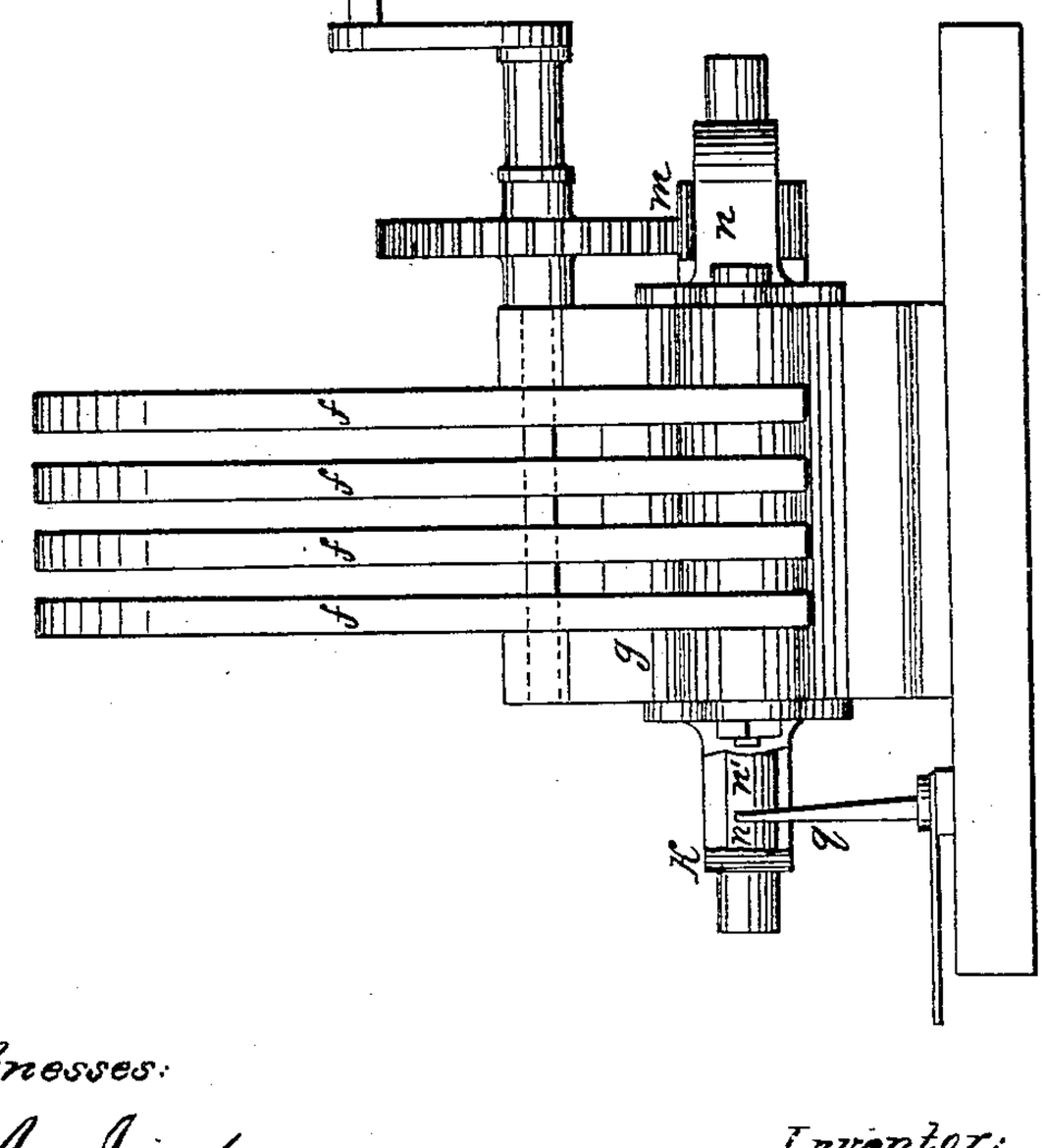


Fig. 2.



Witnesses:

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Inventor:

Henry Wilder.

2 Sheets—Sheet 2.

H. WILDE.

Magneto Electric Machine.

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Patented Nov. 13, 1866.

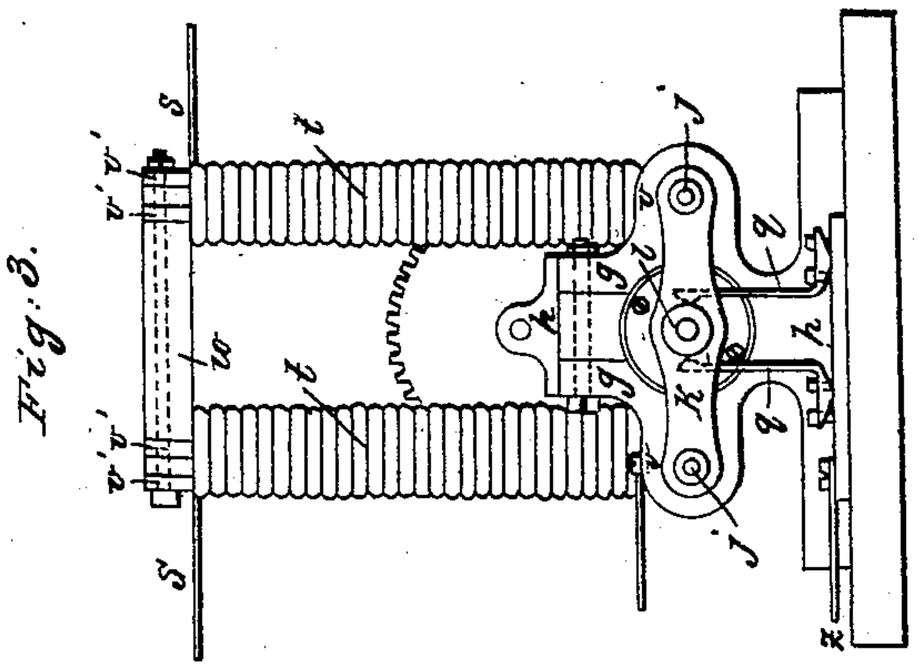

Fig. 3.

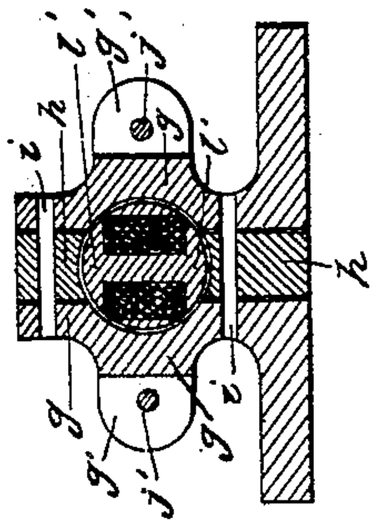

Fig. 5.

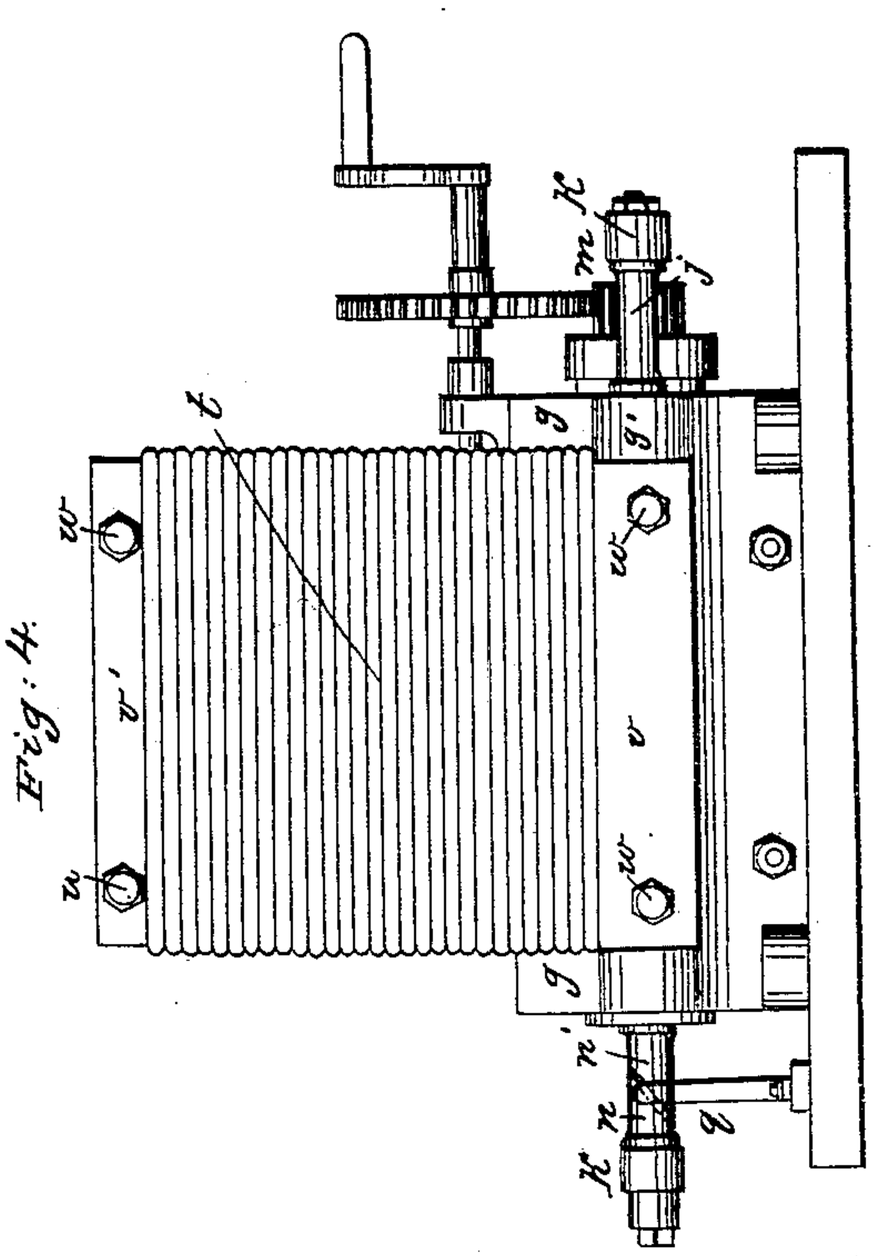

Fig. 4.

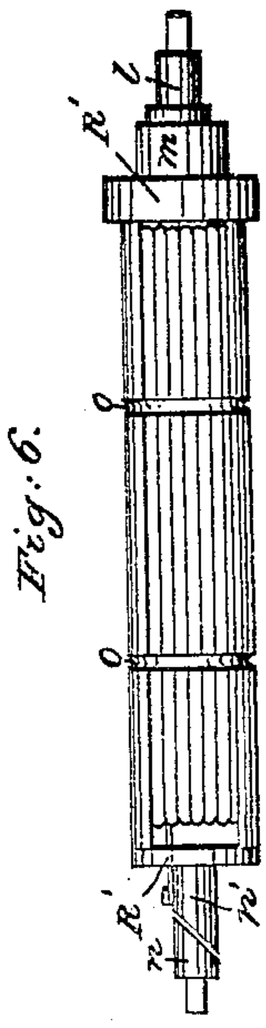

Fig. 6.

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UNITED STATES PATENT OFFICE.

HENRY WILDE, OF MANCHESTER, ENGLAND.

IMPROVEMENT IN MAGNETO-ELECTRIC MACHINES.

Specification forming part of Letters Patent No. **59,738**, dated November 13, 1866.

To all whom it may concern:

Be it known that I, HENRY WILDE, of Manchester, England, have invented certain new and useful Improvements in Magneto-Electric and in Electro-Magnetic Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents an end view of a magneto-electro machine constructed according to this invention. Fig. 2 is a side elevation of the same. Fig. 3 is an end view of an electro-magnetic machine constructed according to this invention. Fig. 4 is a side elevation of the same. Fig. 5 is a transverse section of the revolving armature. Fig. 6 is a side elevation of the same detached.

Similar letters of reference indicate like parts.

This invention relates to certain improvements in that class of machines known as "magneto-electric machines," which improvements are also applicable to electro-magnetic machines; and it relates, furthermore, to a combination of one or more magneto-electric machines with one or more electro-magnetic machines, whereby an electric current of any desired power can be produced.

My magneto-electric machine consists of a series of permanent magnets of horseshoe form fixed on the magnet-cylinder *g*. This magnet-cylinder is formed of two segmental pieces of cast-iron and of two intermediate pieces, *h*, of brass, of the same length as the segments, and fastened together by bolts *i*, or any suitable means. A smooth and parallel hole is bored through the cylinder. Two brackets, *j j*, are secured in the cast-iron projection *g' g'*, one at each end, to form the bearings *k k* for the journals of the revolving armature.

The armature (see Figs. 5 and 6) is made of cast-iron turned parallel throughout its entire length, and about one-twentieth of an inch less in diameter than the hole in the magnet-cylinder, so that it may revolve in very close proximity to the interior of said cylinder, but without touching.

Two brass disks or caps, *k' k'*, (see Fig. 6,) having concentric prolongations for holding the steel journals *l l*, are fitted by means of screws, one at each end of the armature. A pulley, *m*, for driving the armature, is fixed upon the cylindrical axis of the cap *k'*. At the other end of the armature a commutator, *n n'*, of hardened steel, is also fixed. (See Figs. 3 and 6.)

A quantity of insulated copper wire is wound upon the armature in the direction of its length, as shown in Fig. 6. The inner extremity of this wire is fixed in good metallic contact with the armature, and its outer extremity is connected with the insulated half of the commutator *n'* by means of a clip and binding-screw. Bands of sheet-brass, *o o*, encircling the arimature at intervals, and sunk below the surface of the iron in grooves turned out for their reception, prevent the convolutions of insulated wire from flying out of position by the centrifugal force attending their revolution.

By means of a driving-strap the armature is made to revolve in the interior of the magnet-cylinder at about twenty-five hundred revolutions per minute, and two waves of electricity moving in alternate directions are generated during each revolution of the armature. The rapid succession of alternating waves thus generated are taken from the machine as an intermittent current moving in one direction only. This is accomplished by means of two steel springs, *q q*, which rub against opposite sides of the commutator *n n'*. The springs *q q* are connected with the polar terminals of the electro-magnets of the electro-magnetic machine by means of the wires *s s*.

It is obvious that the magneto-electric machine may be placed either upon the top of the electro-magnetic machine or by the side of it on the same base, as may be found most convenient for the driving apparatus.

The electro-magnetic machine is very similar to the magneto-electric machine just described, except that a large electro-magnet, *t*, (see Figs. 3 and 4,) is substituted for the permanent magnets *f* on the magnet-cylinder. The electro-magnet *t* is formed of two rectangular plates, *v v*, of rolled iron, as shown by the dotted lines. They are bolted parallel with each other, and between the iron bars *v' v'*, to the sides of the magnet-cylinder by means of the bolt *w*.

The upper extremities of these plates are united by a bridge, *x*, which may be made of two thicknesses of the same iron as that of which the sides are made, separated from each other by an iron packing, which makes the entire depth of the bridge equal to the width of the bars *v' v'*. The bridge is fixed between the plates *v' v'* by means of long iron bolts extending from one side of the magnet to the other, as shown in Fig. 4.

Each of the sides of the electro-magnet is coiled with an insulated conductor consisting of a bundle of copper wires laid parallel to each, and bound together with double covering of linen tape. Two of the extremities of the coils are coupled up, so as to form a continuous circuit. The other extremities of the coils may be connected with the wires of the magneto-electric machine.

The armature is wound with an insulated strand of copper wires, as seen in Fig. 5. The convolutions of the wires are protected from external injury by a suitable wooden casing, *l'*. (See Fig. 5.)

A pulley, *m*, is keyed upon one end of the armature, and upon the other end are fixed two hardened-steel collars, *n n'*, one of which is insulated from the armature-axis, as previously described. The alternating currents of electricity are taken from the steel collars by means of the springs *q q*, and can be conveyed to any place required by means of the conductors *z z*.

The armature of the electro-magnetic machine is driven at about eighteen hundred revolutions per minute, and the journals and commutators of both armatures are to be finished with suitable lubricating apparatus for maintaining a constant supply of oil to the rubbing-surfaces.

The action of the machine is as follows: The electricity derived from the permanent magnets *f f* by the revolution of the armature of the magneto-electric machine is transmitted by means of the wires *s s* through the coils of the large electro-magnet of the electro-magnetic machine, the iron plates *v v* and magnet-cylinder of which an amount of magnetism some hundreds of times greater than that possessed by the permanent magnets of the magneto-electric machine. As the armatures of the magneto-electric and electro-magnetic machines are driven simultaneously, a proportionately large amount of electricity is evolved from the armature-wires of the electro-magnetic machine, and the electricity thus generated may be used either for transmitting signals for producing the electric light, for electro-deposition, or for other purposes.

The commutator *n n'* of the magneto-electric machine is cut diagonally, in order that it may run more freely over the springs *q q* bearing upon it, and also for the purpose of making a short circuit between the coils of the magneto-electric machine and the coils of the electro-magnet of the electro-magnetic machine whenever the commutator *n n'* is at the dead-point, or at that part of its revolution in which no electricity is generated by the magneto-electric machine. The object of the short circuit is to increase the power of the electro-magnet to a much greater degree than would be the case if the short circuit were not made.

When the electricity from the magneto-electric machine is passing through the coils of the large electro-magnet the current passes uninterruptedly through the entire circuit, which may be indicated by a continuous loop or circle, O; but when the short circuit is made, as above referred to, by means of the springs *q* bearing upon both halves of the commutators *n n'* at the same time, as shown in Fig. 2, the two currents of electricity—one in the wire of the electro-magnet and the other in the wire surrounding the armature of the magneto-electric machine—are made to flow for a moment in two closed or short circuits, as may be indicated by the numeral 8.

Instead of exciting the coils of the large electro-magnetic machine with a voltaic battery or small magneto-electric machine, as above described, a thermo-electric battery may be used, or an electro-magnetic induction-machine similar to that shown in Figs. 3, 4, 6, and 7, or any other electro-magnetic induction-machine the currents from which may be made to pass in one direction by means of a commutator; and the electro-magnet of this exciting electro-magnetic induction-machine may, in its turn, be excited by another small magneto-electric machine or any well-known source of electricity.

In order that the electricity generated by the electro-magnetic machine above described may be used for transmitting signals, particularly through uninsulated submarine cables, the poles of the machine are connected to the cable in the ordinary or any other suitable manner, and a current of electricity can be produced of sufficient power to pass through a cable of any desired length.

What I claim as new, and desire to secure by Letters Patent, is—

1. The method of constructing magnet-cylinders for magneto-electric and electro-magnetic machines by making them of segmental iron concaves with intervening strips of wood, brass, or other non-electric material, substantially as set forth.

2. The combination of a magneto-electric and electro-magnetic machine, constructed and operating substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand before two subscribing witnesses.

HENRY WILDE.

Witnesses:
H. B. BARLOW,
Patent Agent, Manchester.
JOHN PERKINS,
Draftsman, Manchester.