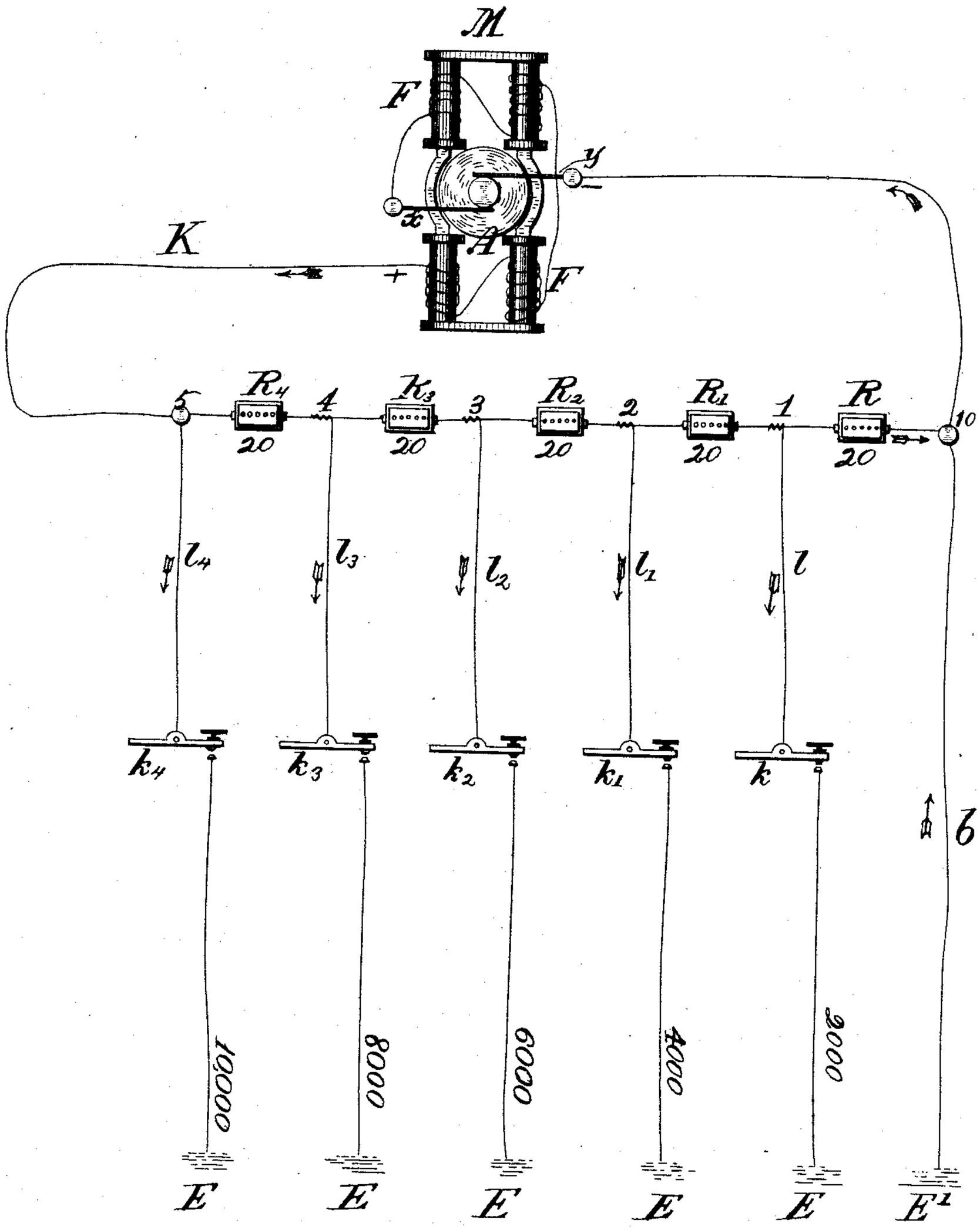
(No Model.)

S. D. FIELD.

DYNAMO TELEGRAPHY.

No. 343,953. Patented June 15, 1886.



Witnesses
S. R. Grammer
Mrs. K. Lockwood French

Inventor;
Stephen D. Field,
by his Attorney,
C. L. Buckingham

UNITED STATES PATENT OFFICE.

STEPHEN D. FIELD, OF NEW YORK, N. Y., ASSIGNOR TO THE WESTERN UNION TELEGRAPH COMPANY, OF SAME PLACE.

DYNAMO-TELEGRAPHY.

SPECIFICATION forming part of Letters Patent No. 343,953, dated June 15, 1886.

Application filed February 14, 1881. Serial No. 26,096. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN D. FIELD, of the city, county, and State of New York, have invented a new and useful Improvement in the Application of Dynamo-Electric Machines for Telegraphic Purposes, of which the following is a specification.

My invention consists of means for the application of dynamo-machines to feed a great number of telegraph-lines; and to this end I join the opposite poles of the machine with a constantly-closed shunt of a resistance sufficiently great to avoid heating the machine, owing to the short-circuiting of the machine through said shunt, the resistance also being made sufficiently great to avoid an undue waste or consumption of energy. On the other hand, the resistance of the shunt should be sufficiently low in comparison with the electro-motive force of the machine that a current of adequate strength may flow through the shunt to maintain an ample amount of field-magnetism.

The resistance of the shunt consists of many component parts, the number corresponding to the number of variations of potential required in respect to lines of various resistances to be charged, in order that equally-strong currents upon all of the lines may be obtained. At intermediate points between the component resistances telegraph-lines are joined to the shunt, whereby any particular line may be joined with the shunt at such a point that the resistance between the point of junction and one pole of the machine may have such a desired relation to the resistance between the said point of junction and the opposite pole of the machine that a strength of current may be diverted from the shunt to feed the line which shall correspond with the resistance of the particular line, as will be hereinafter fully explained.

The component resistances at points of varying electrical potential consist of small resistances of equal or unequal amounts whose aggregate comprises the desired shunt-resistance.

In an application executed by me February 4, 1881, and designated as "Case A," I have broadly set forth and claimed a shunt constantly joining the opposite poles of an accumulative or single-current dynamo-machine used to charge a series of telegraph-lines, and such broad matter I desire to disclaim in this application, and limit myself herein alone to a shunt-resistance joining the opposite poles of a single-current or accumulative dynamo-machine consisting of a series of component resistances, whereby lines of various resistances may be fed with equal current strengths.

I will now explain my invention by reference to the accompanying drawing, forming a part of this specification.

In the diagram, M represents an accumulative or single-current dynamo-machine, from whose armature A currents are conveyed from brush x around the field-cores F, over K, to point 5, thence over the shunt S, through component resistances R R′ R² R³ R⁴, successively from a higher to a lower potential to point 10 and commutator-brush y, back to armature A.

l l' l^2 l^3 l^4 represent telegraph-lines joined to the shunt, respectively, at points 1, 2, 3, 4, and 5. If one or all of keys k k' k^2 k^3 k^4 be closed, current will be diverted from the shunt. If key k^3 alone be closed, current passing over K and through R⁴ will be divided at 4, one portion continuing along the shunt to the opposite pole of the machine, while the remainder will fill the line and find a complete circuit from the earth-connection E of the line through the earth to earth-connection E′ of branch b, to the opposite pole of the dynamo-machine, through branch b to point 10 and brush y.

The various lines to be fed are attached to either points 1, 2, 3, 4, or 5, which are at different electrical potentials, according to their resistances. If the line-resistance is very great, it should be connected with the shunt at point 5. If the line is very short and of low resistance, it should be from point 1; or, if of an intermediate resistance, it should be connected to one of the intermediate points, 2, 3, or 4. Obviously, if resistances of R, R′, R², R³, and R⁴ are all equal, and the internal resistance of the dynamo-machine be very low, the electrical potential at point 5 will be five times as great as the electrical potential at point 1,

whereupon l' and l^4 will be charged with equal current strengths. If the resistance of l^4 be five times that of l; or, if the resistances of the lines are represented by 1, 2, 3, 4, and 5, they will all be charged with one strength of current, providing they are separately closed, for the reason that the current which divides at 1 will pass over two branches whose resistances are in the same ratio as the resistances of the two branches over which the current divides at either of points 5, 4, 3, or 2. If each of the component resistances be of twenty ohms, and their aggregate resistance be one hundred ohms, and l^4 have a resistance of ten thousand ohms and l of two thousand ohms, the current strengths upon both lines will be about equal, as the magnitude of the current which divides at 5 is substantially the same as the magnitude which divides at 1. In the first instance the current from the generator divides over two branches of one hundred and ten thousand ohms, respectively, while in the second case an equal current divides over two branches of twenty and two thousand ohms; the amount of current flowing over the branches of one hundred ohms will equal the amount flowing over the branch of twenty ohms, and the currents flowing over the branches of ten thousand and two thousand ohms each will consequently be equal.

From the above description it will be seen that all lines of about two thousand ohms should be taken from the shunt at point 7, while if the resistances of the lines are of four thousand, six thousand, eight thousand, or ten thousand ohms the lines should be taken from points 2, 3, 4, and 5, respectively. These proportions merely indicate the principle of my invention. I therefore do not limit my invention by them.

The number of component resistances may be of any number and of any amounts, as occasion may require.

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

1. As a means for enabling different strengths of electrical currents to be derived from one and the same dynamo-electric machine, the combination, substantially as specified, of a dynamo-electric machine whose opposite poles are joined by a constantly-closed shunt-conductor whose different points are of varying electrical potential, and one or more electrical conductors joined to said shunt at points of such electrical potential as correspond with the strength of current desired.

2. A shunt connecting the opposite poles of a dynamo-machine whose aggregate resistance consists of a series of component resistances, in combination with a series of telegraph-lines which are connected to the shunt at points intermediate between the component resistances of said shunt, as described.

3. In combination with a series of telegraph-lines of different resistances, a dynamo-machine provided with a shunt having component resistances, said lines being connected to the shunt at such points that lines of various resistances will be charged with equal current strength.

4. A shunt for a dynamo-machine whose resistance is distributed along its length, in combination with a series of telegraph-lines of various resistance, connected thereto in such manner that a line of little resistance will be charged with approximately the same strength of current as a line of great resistance.

5. The combination of a machine, M, shunt K, resistance $R\ R'\ R^2\ R^3\ R^4$, and lines $l\ l'\ l^2\ l^3\ l^4$, or an equivalent thereof, as described.

Signed this 8th day of February, 1881.

STEPHEN D. FIELD.

Witnesses:
S. R. GRAMMER,
JOHN C. SANDERS.