



New York March 12 1893

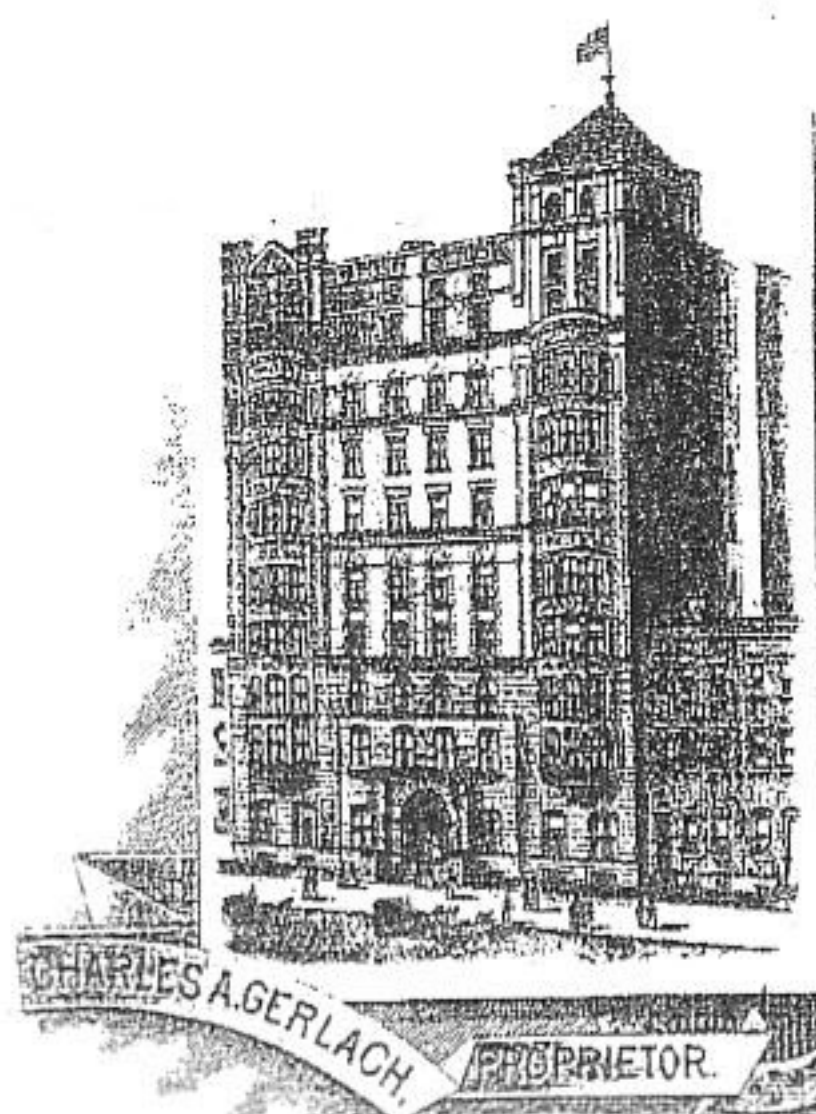
Dear Mr. Adams,

Although I have had exchange of thoughts with you in regard to your
pat. of Feb. 23^d. I consider it necessary
to express myself quite clearly and by
letter in regard to the subject.

The patent of Thomson No. 363, 186,
to which reference is made, has absolutely
nothing to do with my discovery of the
rotating magnetic field and the
radically novel features of my system
of transmission of power disclosed
in my foundation patents of 1888.

All the elements shown in the Thomson
patent were well known and had been
used long before by a number of

experimentation. I myself exhibited such devices early in 1887, but I was not encouraged to work in that direction as I found that the motor was very inefficient and that the commutator and brushes caused trouble. I showed in my patents that alternating motors could be run without the employment of a commutator and I produced an efficient and practical motor, which I was able to run either on multiple or single, alternating circuits. In fact, one of the many reasons why I advocate the adoption of two phase currents rather than three phase shown in my patents - was, that a two phase motor was better suitable for single or ordinary alternating circuits and that it could be operated on these circuits with fair efficiency, though smaller than that obtained by the use of multiple supply circuits. Some engineers do not realize this even to-day. As to the Bradley patents,



The Gerlach

STURDY FIRE PROOF
FAMILY HOTEL.

27TH ST. BETWEEN BROADWAY & 6TH AVE. ©

New York

189

To which reference is likewise made,
I would think it fair to all
concerned that a thorough examination
be made of their history and bearing.
Such examination, which has been
made by myself without the slightest
prejudice, will convince you that
in the earliest patents there is not
the least hint of a method of
transmission of power which would
be novel, or of devices which
would not have been described
before. As regards the later
patents they are plainly covered
by my fundamental claims.
Engineers are beginning now to

realize that the carrying capacity
of an alternating plant with currents
of more than one phase is much greater
and that we are forcibly driven to
introduce in our alternating systems
of distribution multiple circuits. Some
think that a perfect alternating motor,
to be run on single circuit, would
satisfy all needs. In reality such
a motor would have a very limited
value in a year or two, when, in
consequence of competition the necessity
will arise to use more than one
circuit. The direct systems had to go
through such a process merely for
the sake of saving some copper, and
their engineers had to make expensive
changes and considerably complicate
the systems at that.

Yours sincerely

A. Tesla.

P. S.

Thanks for clippings received.



The Gerlach

STURDY FIRE PROOF
FAMILY HOTEL.

27TH ST. BETWEEN BROADWAY & 6TH AVE. ©

New York Jan. 9 1893

Dear Mr. Adams,

Last night in going with Mr. White over the clear specification of Prof. Kuhn I noted that Prof. Kuhn wishes the speed of the turbine to be about 150 rev. I thought it barely possible that all the details have not been explained to him and that consequently he might not be aware of several disadvantages resulting from the low speed. For instance from the sketch you showed me I understood, that the distance between the wheel and dynamo was only 8-10 feet on the assumption, that the dynamo had a diameter of something like 19 ft. Now I believe that in the design of H. Schmidt

The dynamo is of nearly the above diameter on the assumption that the speed of the turbine is 250 rev. If you will reduce the speed it would necessitate, if proper rules of construction are observed, that the diameter of the dynamo be made considerably larger, which would leave still a smaller space between the wall and the machine, and this I think, with such magnificent machinery, which will be viewed by thousands, would be decidedly bad. Of course, I need not say that such a low speed dynamo would cost much more. I am of the opinion that you should consider this, so much the more, as Prof. Hurst does not lay particular stress upon the low speed but merely would prefer it if it were practicable. Even with 250 rev. the dynamo is, to be sure, large enough.

Kindly consider this communication and others which I may make entirely private as I would not run the risk of offending Prof. Hurst, whom I highly esteem.

Yours sincerely
W. Tesla.

TESLA MEMORIAL SOCIETY, INC.

21 Maddaket, Southwyck Village
Scotch Plains, New Jersey 07076

Letter from Nikola Tesla to Edward Dean Adams dated January 9, 1893
Draft of text handwritten on Gerlach Family Hotel stationary (italics to show indistinct writing)

(First handwritten page)

New York Jan. 9 1893 (bold preprinted on Hotel stationary)

Dear Mr. Adams,

Last night in going with Mr. White over the *clear* specification of Prof. Xxxx's I noted that Prof. Xxxx's wishes the speed of the turbine to be about 150 rev. I thought it barely possible that all the details have not been explained to him and that consequently he might not be aware of over-load disadvantages resulting from the load speed. For instance from the sketch you showed me I understood, that the distance between the wall and the dynamo was only 8-10 feet on the assumption, that the dynamo had a diameter of something like 19 feet. Now I believe that in the design of Mr. *Schmid*

(Second handwritten page)

the dynamo is of very nearly the above diameter on the assumption that the speed of the turbine is 250 rev. If you would reduce the speed it would necessitate, if proper rules of construction are observed, that the diameter of the dynamo be made considerably larger, which would leave still a smaller space between the wall and the machine, and this I think, with such *significant machinery* which will be viewed by *Morivands*, would be decidedly bad. Of course, I need not say that such a low speed dynamo would cost much more. I am of the opinion that you should consider this, so much the more, as Prof. Xxxx's does not lay particular stress upon the low speed but surely would prefer it if it were practicable. Even with 250 rev. the dynamo is, to be sure, large enough.

Kindly consider this communication and others which I may make entirely personal as I would not run the risk of offending Prof. Xxxx, whom I highly esteem:

Yours sincerely
N Tesla.

WHT/tmsxa

TESLA MEMORIAL SOCIETY, INC.

21 Maddaket, Southwyck Village
Scotch Plains, New Jersey 07076

Letter from Nikola Tesla to Edward Dean Adams dated February 2, 1893
Draft of text handwritten on plain stationery (italics to show indistinct writing or clarification)

(First handwritten page)

Feb. 2, 1893

Dear Mr. Adams,

Your fav. (*favor*) has just reached me. The danger when working unattended is not as great as you may suppose. I have been constantly at work with currents up to a quarter million volts for two or three years past and have met with only one accident. Of all forms of energy harnessed in the service of man, that of electricity is certainly the least dangerous were it only on account of the fact that but a single person can be injured at a time.

I have not as yet heard from Germany but I have not the slightest doubt that all Companies except Helios, who have acquired the rights from my Company will have to stop the manufacture of phase motors. Proceedings against the infringers

(Second handwritten page)

have been taken in the most energetic way by the Helios Co. It is for this reason that our enemies are driven to the single phase system and rapid changes of opinion.

In regard to your query about synchronous motors I would say that the motors will run in exact synchronism with the generator in spite of any number of transformations. We can also make according to my patents changes in the speed as we like. For instance the motor may be made to run at any fraction (within certain limits) or multiples of the speed of the generator. This feature is valuable in the general distribution. I would also say, that besides synchronous forms of motor we have also such as required for the operation of devices requiring great effort but not constant speed, as for instance, cranes e.t.c.

That the phase system is not yet in extensive operation is due merely to circumstances of which you are aware to some extent. A number of motor plants have been put in mines where they have given the utmost satisfaction. There is no danger that the phase system will be superceded (*variant of superseded*) by the single current system. The advantages of the former are to (*sic*) great. Next time I have the pleasure to meet you I will show you the reasons.

Sincerely yours
N Tesla.

P. S. Please kindly excuse this hasty communication. (*Written vertically in the left-hand margin of second page*)

WHT/tmsxb

Visit our website: teslamemorialsociety.org

TESLA MEMORIAL SOCIETY, INC.

21 Maddaket, Southwyck Village
Scotch Plains, New Jersey 07076

Letter from Nikola Tesla to Edward Dean Adams dated February 6, 1893
Draft of text handwritten on plain stationery (italics to show indistinct writing or clarification)

(First handwritten page)

Feb. 6, 1893

Dear Mr. Adams,

I thank you for your attention shown by your letter of the 4th inst. which has reached me in due course together with enclosures which I herewith return.

In regard to the article you had the kindness to call to my notice I would say that the writer has expressed a number of times quite opposite views. I have been sorry to find his contributions as a rule so weak, that it was quite impossible for me to comply with scientific courtesy by answering them. The plan proposed by him is many years old and has been repeatedly tried especially at the debut of the alternating system, but was found impracticable. I would want to have a longer

(Second handwritten page)

talk with you to explain some details and you would at once see the absurdity of the plan. Were it at all practicable I could prove at any time that my system would offer a saving of 40% - 50% over his.

I have to tell you the term "multiphase motors" comprises 3 distinct forms of my motors: 1) Non synchronous (used at *Lauffen*) 2) Synchronous but entirely alternating 3) Synchronous with field - directly *excited*. All criticisms apply only to the first two forms. In both forms the highest efficiency can be reached, and their only defect is that the current is somewhat larger than it ought to be in a perfect machine. This defect, however, does not amount to anything in ordinary practice as it may be made to disappear entirely. To illustrate, we only need to raise the e.m.f. 25% and we save on copper even against the direct current system.

(Third handwritten page)

Objections as to the current have therefore no weight, as it is much easier to run a machine which has no commutator or brushes with an e.m.f. 25% higher than a direct current machine with an adequately smaller e.m.f. Not to speak of the advantages which the ideal simplicity of these machines affords in the long run.

Under frequent conditions in practice it would be entirely impossible for any system to compete this ideally simple one; but I must say that again under different conditions a better solution is possible. This is the third form of my motor. This form

has never been criticized by the adversaries of my system and for a good reason, because it is the most efficient form of electric machine that has been produced to this day. I have shown that on such machines under favorable conditions an efficiency of 97% can be obtained. In output per weight it can be equaled

(Fourth handwritten page)

by no machine whatever, direct or alternating. It also possesses the ideal feature of running in absolute synchronism with the generator, while it has a good starting *figure*. This is the type of machine you have seen and which the W. Co (*assume Westinghouse Company*) propose to use for large units. You need not think that this form of machine has not been thoroughly tried. This machine merely is equivalent to two or three synchronizing machines coupled. A saving of expense and numerous practical advantages of *vital importance* is the result. For large units, especially, it would be utterly impossible for any system to compete with this. The advantages of *this* system are so great that even had we today a perfect alternating current motor requiring two wires, the system would have to be introduced just as soon as it comes to *earning* dividends on the capital. The three wire system offered to the direct current distribution *comprising* very small advantages, yet the three wire system was adopted. But what is recognized merely an advantage in direct current distribution will become dire necessity in the alternating system.

(The following written vertically in the left-hand margin of the fourth page)

Sincerely yours
N Tesla

Excuse haste

WHT/tmsxc

TESLA MEMORIAL SOCIETY, INC.

21 Maddaket, Southwyck Village
Scotch Plains, New Jersey 07076

Letter from Nikola Tesla to Edward Dean Adams dated March 12, 1893
Draft of text handwritten on Gerlach Family Hotel stationary (italics to show indistinct writing or clarification and bold to show text underlining)

(First handwritten page)

New York, March 12 **1893** (bold preprinted on Hotel stationary)

Dear Mr. Adams,

Although I have had exchange of thoughts with you in regard to your fav. (favor) of Feb. 23rd I consider it necessary to express myself quite clearly and by letter in regard to that subject.

The patent of Thomson Nr. 363,186, to which reference is made, has absolutely nothing to do with my discovery of the rotating magnetic field and the radically novel features of my system of transmission of power disclosed in my foundation patents of 1888. All the elements shown in the Thomson patent were well known and had been used long before by a number of

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experimenters. I myself exhibited devices early in 1887, but I was not encouraged to work in that direction as I found that the motor was very inefficient and that the commutator and brushes caused trouble. I showed in my patents that alternating motors could be run without the employment of a commutator and I produced an efficient and practical motor, which I was able to run either on multiple or single alternating circuits. In fact, one of the many reasons why I advocated the adoption of two phase currents rather than three phase shown in my patents was, that a two phase motor was better *suitable for single or ordinary existing circuits and that it could be operated on these circuits with fair efficiency, though smaller than that obtained by the use of multiple supply circuits.* Some engineers do not realize this even today.

As to the *Bradley* patents,

(Third handwritten page – on Hotel letterhead stationary)

to which reference is likewise made, I would think it fair to all concerned that a thorough examination be made of their history and bearing. Such examination, which has been made by myself without the slightest prejudice, will convince you that in the earliest patent there is not the least *hint* of a method of transmission of power which would be novel, or of devices which would not have been described before. As regards the later patents they are plainly covered by my fundamental claims.

Engineers are beginning now to

(Fourth handwritten page)

notice that the *earning* capacity of an alternating plant with currents of **more than one** phase is much greater and that we are forcibly driven to introduce in our alternating systems of distribution multiple circuits. Some think that a perfect alternating motor, to be *on one* single circuit, could satisfy all needs. In reality such a motor would have a very limited value in a year or two, when, in consequence of competition the necessity will rise to use more than one circuit. The direct systems had to go through such a process merely for the sake of saving some copper, and their engineers had to make extensive changes and considerably complicate the systems at that.

Yours sincerely
N. Tesla.

P. S.

Thanks for the clippings received.

/ WHT/tmsxd

TESLA MEMORIAL SOCIETY, INC.

21 Maddaket, Southwyck Village
Scotch Plains, New Jersey 07076

Note from Nikola Tesla to Edward Dean Adams dated March 22, 1893
Draft of text handwritten on 5 x 8 inch lined notepaper (italics to show indistinct writing
or clarification and bold to show text underlining)

(First handwritten sheet)

New York March 22, 1893.

Dear Mr. Adams,

Your fav. (*favor/letter*) received. I forward copy of "Electrician" of Aug. 5.

The writers of these articles are absolutely unacquainted (that is they **were**) with some facts. For instance they do not know that by merely **winding** the motor in a certain way absolute constancy of the field is obtained with **two phases**, so that it is the same as far as this is concerned

(Second handwritten sheet)

whether there are *two* or a million phases. But the **gravest error** the Authors make is that they express the belief that the constancy of field is **important for the efficiency** of the motor. In my earlier work I thought so and constructed **motors with many phases**. You will find in going over my writings and patents that I **have before advanced** all these views, and what these writers state in this journal is **merely a repetition** of what I have shown or stated. But I convinced myself that it is not im-

(Third handwritten sheet)

portant at all to have the field constant. The chief importance in an alternate current motor rests upon the *intimate* magnetic connection between the field and armature coils, as I have pointed out long ago. But even the closure of the magnetic circuit must be influenced by practical considerations. For instance some of my first motors I made with holes in the armature and field **in order** to close the magnetic circuit more completely. This *causes* some disadvantages **when** the machine is worked

(Fourth handwritten sheet)

directly, also when it is operated from a transformer (more or less). We found that for each motor, according to what it is built for, certain rules of construction had to be followed. On this entire books can be written. Even presently there are perhaps one half a dozen Engineers who know fairly well this subject.

I have to advise you to accept the two phase plan, though it would be much more for my personal interest if you would decide for the three phase. I shall explain this to you when I next have the pleasure of meeting you.

Yours sincerely

N Tesla.

Excuse in haste

WHT/tmsxf