

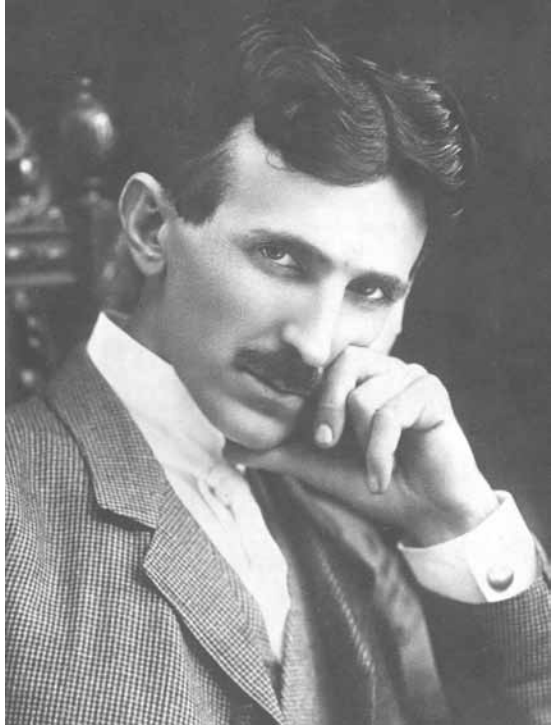
WHAT WE WILL DO WITH ELECTRICITY

by **Nikola Tesla**

1916

THE FAIRY TALE OF ELECTRICITY

Whoever wishes to get a true appreciation of the greatness of our age should study the history of electrical development. There he will find a story more wonderful than any tale from the Arabian Nights. It begins long before the Christian era when Thales, Theophrastus and Pliny tell of the magic properties of electron - the precious substance we call amber - that came from the pure tears of the Helia-des, sister of Phaeton, the unfortunate youth who attempted to run the blazing chariot of Phoebus and nearly burned up the earth.



Nikola Tesla

It was but natural for the vivid imagination of the Greeks to ascribe the mysterious manifestations to a hyperphysical cause, to endow the amber with life and with a soul. Whether this was actual belief or merely poetic interpretation is still a question. Even at this very day many of the most enlightened people think that the pearl is alive, that it grows more lustrous and beautiful in the warm contact of the human body. So too, it is the opinion of men of science that a crystal is a living being and this view is being extended to embrace the entire physical universe since Prof. Jagadis Chunder Bose has demonstrated, in a series of remarkable experiments, that inanimate matter responds to stimuli in exactly the same manner as plant fiber and animal tissue.

The superstitious belief of the ancients, if it existed at all, can therefore not be taken as a reliable proof of their ignorance, but just how much

“WORLD SYSTEM” OF WIRELESS TRANSMISSION OF ENERGY

by Dr. Nikola Tesla

The transmission of power without wires is not a theory or a mere possibility, as it appears to most people, but a fact demonstrated by me in experiments which have extended for years. Nor did the idea present itself to me all of a sudden, but was the result of a very slow and gradual development and a logical consequence of my investigations which were earnestly undertaken in 1893 when I gave the world the first outline of my system of broadcasting wireless energy for all purposes. In several demonstrative lectures before scientific societies during the preceding three years, I showed that it was not necessary to use two wires in transmitting electrical energy, but that one only might be employed equally well. My experiments with currents of high frequencies were the first ever performed in public and elicited the keenest interest on account of the possibilities they opened up and striking character of the phenomena. Few of the experts familiar with the up-to-date appliances will appreciate the difficulty of my task with the elementary devices I had then at command, as accurate adjustments for resonance had to be made in every experiment.

The transmission of energy through a single conductor without return having been found practicable it occurred to me that possibly even that one wire might be dispensed with and the earth used to convey the energy from the transmitter to the receiver.

HIGH FREQUENCY DYNAMO AND “TESLA COIL”

Manifestly, currents such as were ordinarily employed in the arts and industries were unsuitable and I had to devise special generators and transformers for furnishing impulses of the requisite quality.

First, I perfected high frequency dynamos which were of two types, one with a direct current field excitation and the other in which the magnet was energized by alternating currents of different phase, producing a rotating magnetic field. Both of these have found employment in connection with my broadcasting wireless system. In the first machine I exhibited an efficiency of ninety per cent. was attained, but it was necessary to run it in hydrogen or rarefied air to minimize the otherwise prohibitive windage loss and deafening noise.

In order to overcome the inherent limitations of such machines I next concentrated my efforts on the perfection of a peculiar transformer

consisting of several tuned circuits in inductive relation which received the primary energy from oscillatory discharges of condensers. This apparatus, originally identified with my name and considered by the leading scientific men my best achievement, is now used in every wireless transmitter and receiver throughout the world. It has enabled me to obtain currents of any desired frequency, electromotive force and volume, and to produce a great variety of electrical, chemical, thermal, light and other effects. Roentgen, cathodic and other rays of transcending intensities. I



Nikola Tesla

have employed it in my investigations of the constitution of matter and radioactivity, published from 1896 to 1898 in the *Electrical Review* in which it was demonstrated, prior to the discovery of Radium by Mme, Sklodowska and Pierre Curie, that radio-activity is a common property of matter and that such bodies emit small particles of various sizes and great velocities, a view which was received with incredulity but finally recognized as true. It has been put to innumerable uses and proved in the hands of others a veritable lamp of Aladdin.

As I think of my earliest coils, which were nothing more than scientific toys, the subsequent development appears to me like a dream.

THE "MAGNIFYING TRANSMITTER" AND EARTH RESONANCE

While I was perfectly convinced, from the outset, that success would be ultimately achieved, it was not until by slow improvement I evolved the so-called "Magnifying Transmitter" that I obtained convincing evidence of the feasibility of wireless power transmission on a vast scale for all industrial purposes.

The chief discovery, which satisfied me thoroughly as to the practicability of my plan, was made in 1899 at Colorado Springs, where I carried on tests with a generator of fifteen hundred kilowatt capacity

A VISIT TO NIKOLA TESLA

How the Greatest American Scientist lives

Mr. Tesla About himself, about other scientists, and his Fatherland

Reprinted from "POLITIKA" BEOGRAD, Wednesday, April 27, 1927 No. 6824, Vol. XXIV

Arriving in New York in July, 1926, I wrote to Mr. Tesla, asking for an audience in order that I might perhaps be able to tell our Yugoslav public something that would, undoubtedly, be interesting to them. Mr. Tesla is a very busy man and often travels, so through his sincere friend, Dr. Paul Radosavljevich, Professor at New York University, the audience was postponed until January 13, 1927. In the meantime I visited several eastern cities in the United States.



In the center of New York, between the Hudson and East Rivers, on 34th and Broadway, is located the massive Pennsylvania Hotel. Under the hotel is the Pennsylvania Railroad Station from which the trains leave through tunnels of both rivers to

various points in America. On the fifteenth floor of this sky-scraper hotel, facing south-east, lives Mr. Nikola Tesla the engineer.

On the appointed day, about 7:15 P.M., I entered this callosal building whose corridors were thronging with people. On the left side is a bank with its various departments serving the guests, and on the right side various hotel service departments are located. Through this mass of people I managed to get to the house phone and called room 1522 E.

“Do I have the pleasure to talk with the engineer, Mr. Nikola Tesla,” I asked in English when I got the connection?

“Yes, Mister,” was the answer. The voice was clear, loud and determined.

“Can I talk to you in our mother tongue?”

“Ah, that’s you, Mr. Petkovich! I’ll be down in ten minutes. Just wait for

United States Patent (abridged)

Re. 28,742

Rafferty et al.

Reissued Mar. 23, 1976

PUMPS CAPABLE OF USE AS HEART PUMPS

Inventors: Edson Howard Rafferty, 419 Ontario St., S.W.E.; Harold D. Kletschka, 1925 Noble Drive, both of Minneapolis, Minn. 55414. Filed: Jan. 3, 1972 Appl. No.: 215,221 Reissue of Patent No.: 3,487,784 Issued: Jan. 6, 1970; Appl. No.: 678,265 Filed: Oct. 26, 1967

ABSTRACT

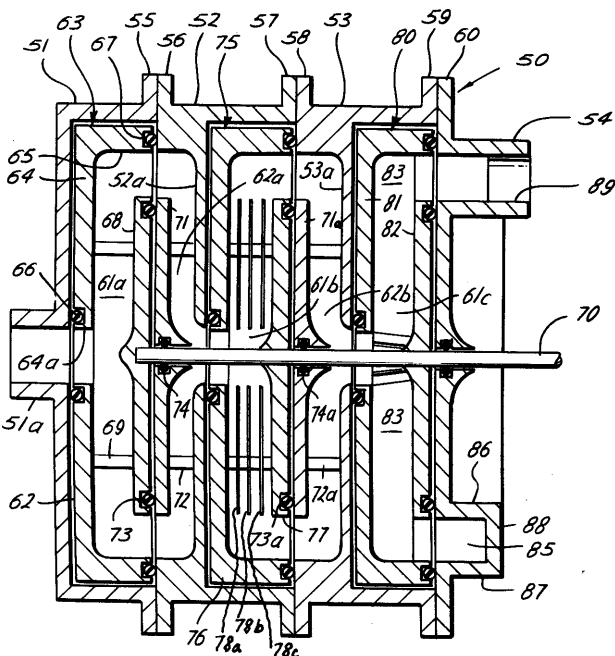
The disclosure is of pumps which are capable of use as heart pumps, that is, for pumping blood in connection with the maintenance of the life function in a human or animal body to replace one or more pumping functions of the heart.

BACKGROUND OF THE INVENTION

Field of the invention

The field of the invention is the field relating to apparatus for pumping blood of a living person, or of a living animal, to replace one or more pumping functions of the human or animal heart in case of disability thereof.

While the pumps provided according to the invention are provided principally for pumping blood, it will be apparent that the pumps may be employed in other instances for pumping other materials. The pumping equipment provided by the invention has rotating fluid accelerators or rotators. The pumps are adapted for pumping of blood and other



plasma, a pale yellow liquid containing microscopic materials including the red corpuscles (erythrocytes), white corpuscles (leukocytes), and platelets (thrombocytes). These and the other constituents of blood, as well as the nature of suspension of these materials in blood, are fairly readily affected by the manner in which blood is physically handled or treated. Blood subjected to mechanical shear, to impact, to depressurization, or the like, may be seriously damaged. The balance between the blood constituents may be affected. Commencement of deterioration may result from physical mishandling of blood. Blood which has been damaged may be unfit for use.

The heart pumps blood through the body in a circulating, cyclic, fashion. The blood passes repeatedly through the heart. A pump for replacing one or more pumping functions of the heart should therefore be capable of repeatedly pumping the same blood, time and time again, without damaging the blood, at least not more than to the extent where the body can function to repair or replace the blood components and eliminate damaged and waste materials therefrom.

Blood also contains dissolved and chemically combined gases, which may be seriously affected by improper physical handling of the blood. It has, for example, been established that subjecting blood to negative or subatmospheric pressures of, say, minus 300 millimeters of mercury, is detrimental, even when the reduced pressures are only temporary.



N. TESLA.
FLUID PROPULSION.
APPLICATION FILED OCT. 21, 1909.

1,061,142.

Patented May 6, 1913.

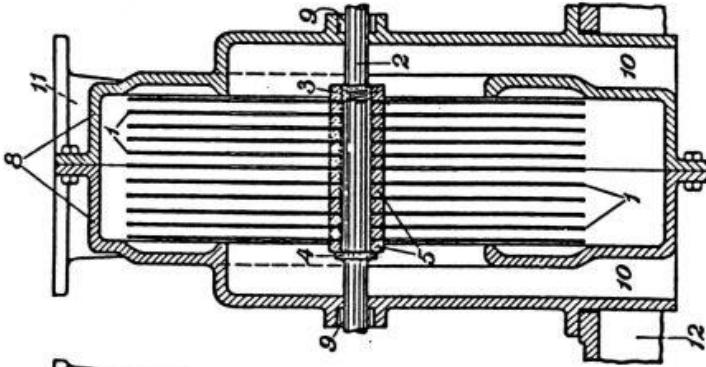


Fig 2

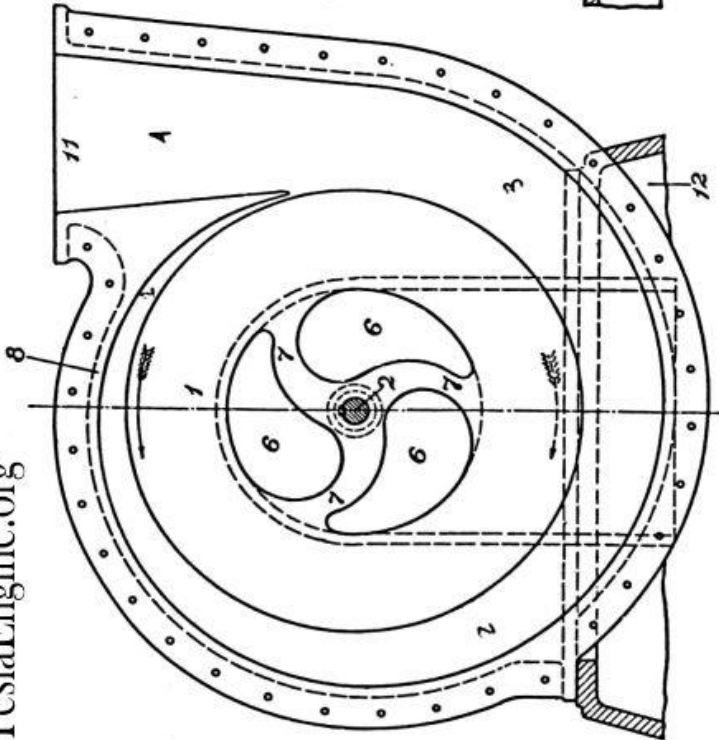


Fig 1

TeslaEngine.org

Witnesses:
R. Ding Buntger
S. J. Dunham

Nikola Tesla,
Inventor

By his Attorneys
Wm. Page Cooper & Hayward

N. TESLA.
TURBINE.

APPLICATION FILED JAN. 17, 1911.

1,061,206.

Patented May 6, 1913.

TeslaEngine.org

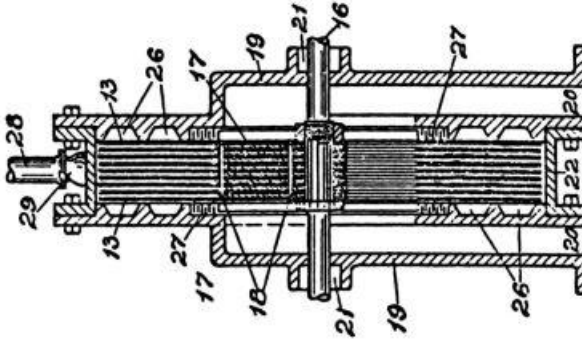


Fig. 2.

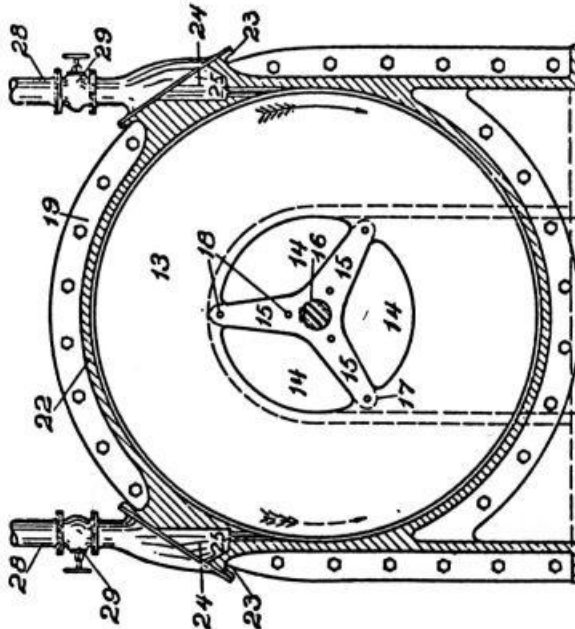


Fig. 1.

Witnesses:
A. Ding Amstrong
Wm. Kohler

Nikola Tesla, Inventor
By *His Attorneys*
New Page Cooper & Hayward

N. TESLA.
SPEED INDICATOR.

APPLICATION FILED MAY 29, 1914.

1,209,359.

Patented Dec. 19, 1916.

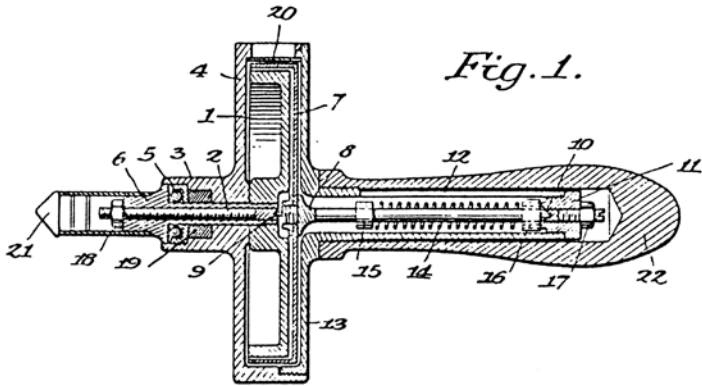


Fig. 1.

Fig. 3.

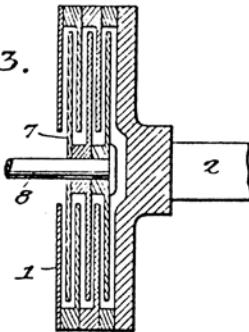


Fig. 4.

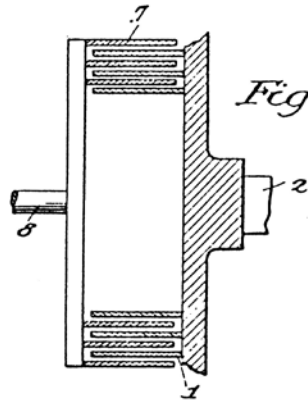
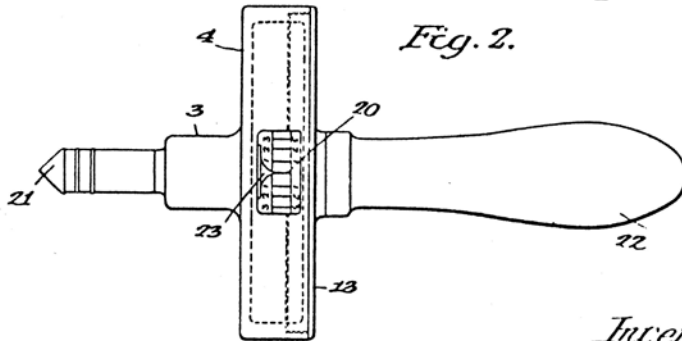


Fig. 2.



Inventor:
Nikola Tesla
Forie Rainalway
attorney

To all whom it may concern:

Be it known that I, Nikola Tesla, a citizen of the United States, residing at New York, in the county and State of New York, have invented certain new and useful Improvements in Speed-Indicators, of which the following is a full, clear, and exact description.

In the provision of speed indicators, that give direct readings of rate of motion,—for example shaft speeds in terms of revolutions per minute or vehicle speeds in miles per



A Waltham Speedometer/Odometer used Tesla's Patent

hour—it is obviously important that the instrument be simple, inexpensive and durable, and that its indications be correct throughout a wide range of speed. Likewise it is very desirable that its operation shall be subject to little or no appreciable deviation from accuracy under normal or expected extraneous changes, such as those of atmospheric density, temperature, or magnetic influence, in order that the structure may be free from any complications incident to the employment of specific means compensating for such varying conditions.

My present invention supplies a speed measuring appliance amply satisfying commercial demands as above stated, in a structure wherein the adhesion and viscosity of a gaseous medium, preferably air, is utilized for torque-transmission between the driving and driven members.

More particularly, my invention provides a rotatable primary and a mechanically resistant or biased pivoted secondary element, cooperating through an intervening fluid medium to produce, inherently, without the use of compensating instrumentalities, angular displacements of the secondary element in linear proportion to the rate of rotation of the primary, so that the reading scale may be uniformly graduated. This latter advantage is secured through the application of novel principles, discovered by me, which will be presently elucidated.

In investigating the effects of fluids in motion upon rotative systems I have observed that under certain conditions to be hereafter defined, the drag or turning effort exerted by the fluid is exactly proportionate to its velocity relative to the system. This I have found to be true of gaseous and liquid media, with the distinction however, that the limits within which the law holds good are narrower for the latter, especially so when the specific gravity

N. TESLA.

VALVULAR CONDUIT.

APPLICATION FILED FEB. 21, 1916. RENEWED JULY 8, 1919.

1,329,559.

Patented Feb. 3, 1920.

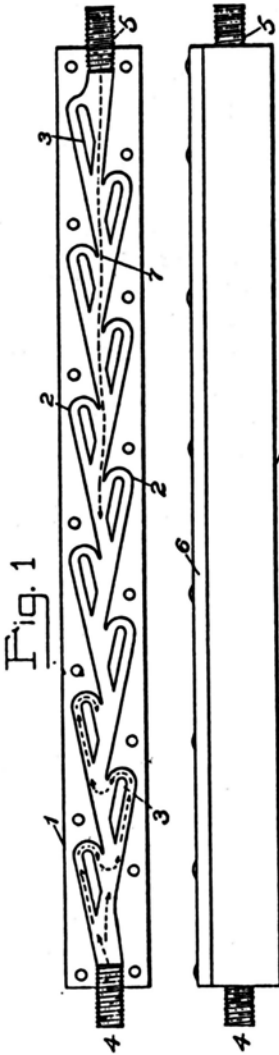


Fig. 1

Fig. 2

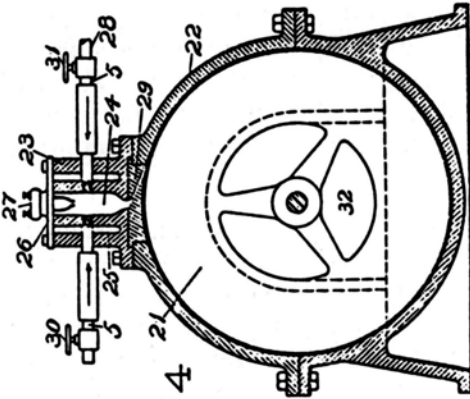


Fig. 4

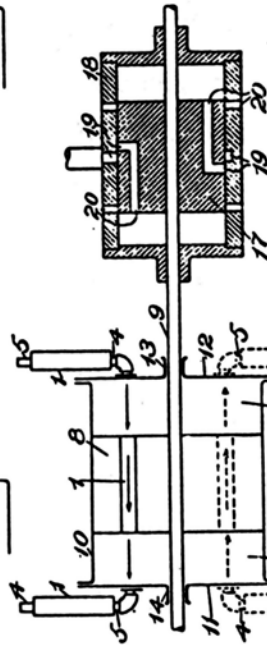


Fig. 3

INVENTOR

Nikola Tesla

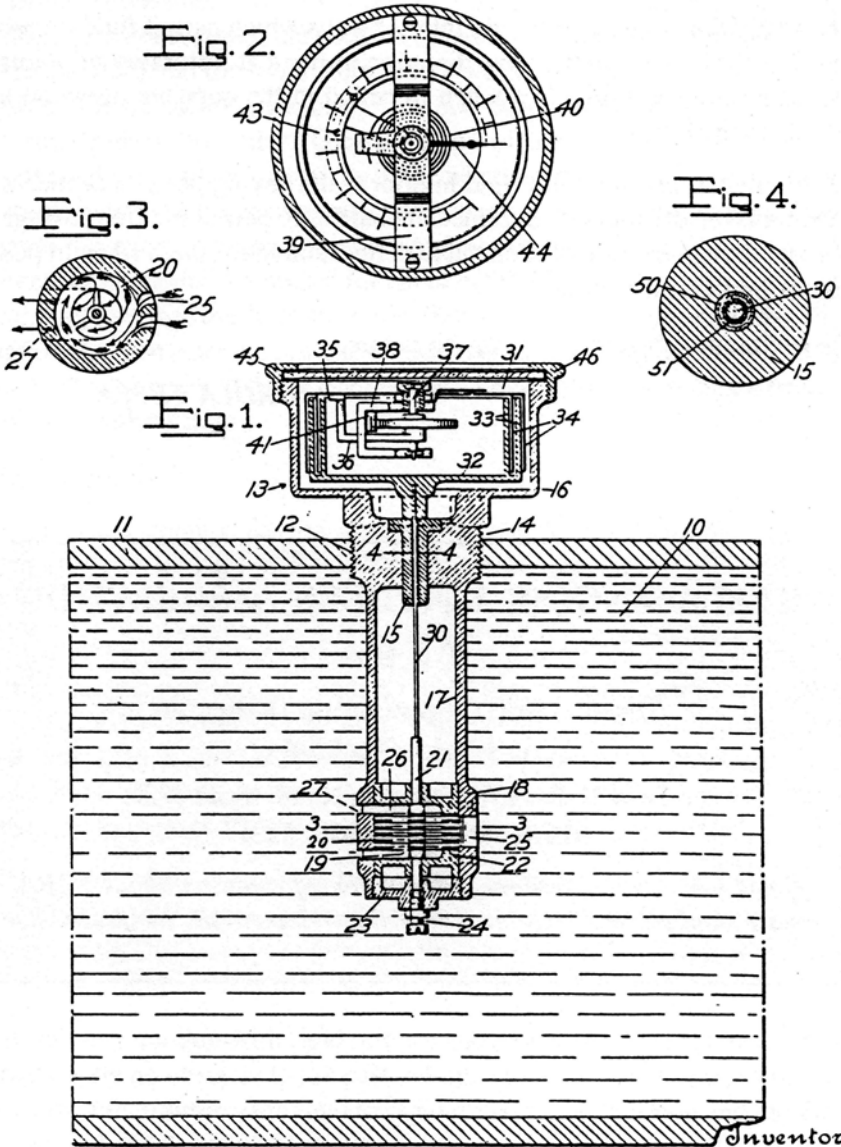
BY *Spur, Page, Cooper & Raymond*
ATTORNEY

N. TESLA.
FLOW METER.

APPLICATION FILED DEC. 18, 1916.

1,365,547.

Patented Jan. 11, 1921.

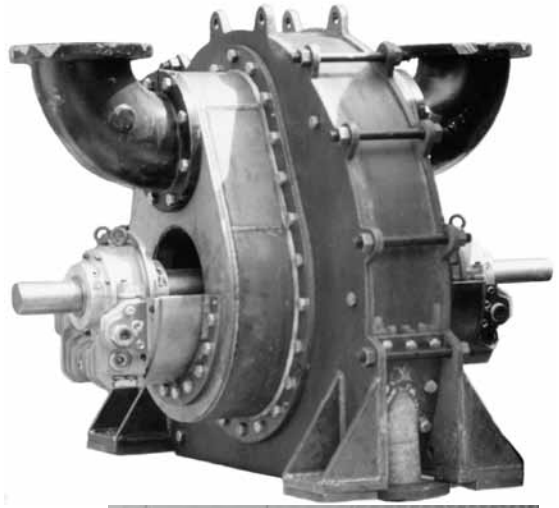


Inventor
Nikola Tesla
By his Attorneys
Forie Bain & May

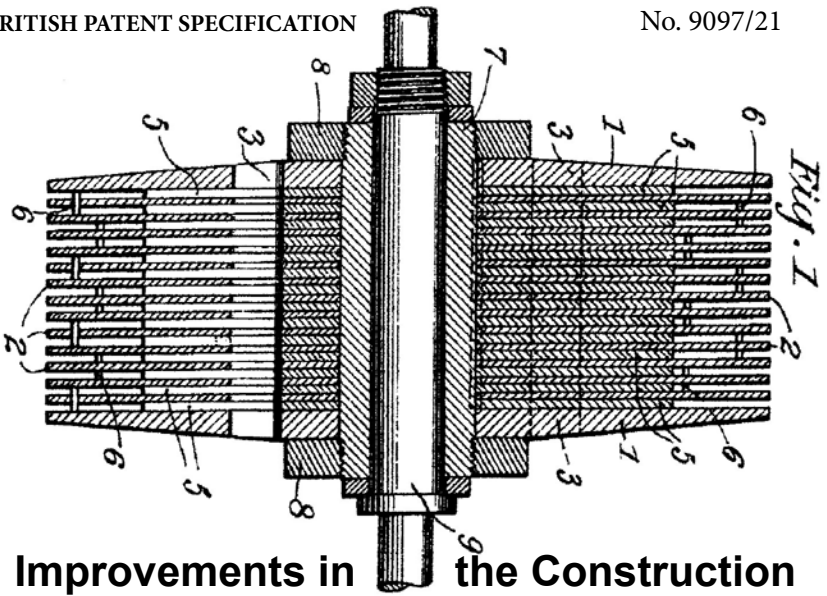
Pictured here is a Tesla turbine Constructed by TEBA Member Entrican Machine. It contains a 48" diameter runner employing Tesla's patent: "Improvements in the Construction of Steam and Gas Turbines," featured on the next page.

This is the first modern turbine, to our knowledge, that actually employed this construction technique. These methods were refinements made by Tesla in the latter days of his turbine experience.

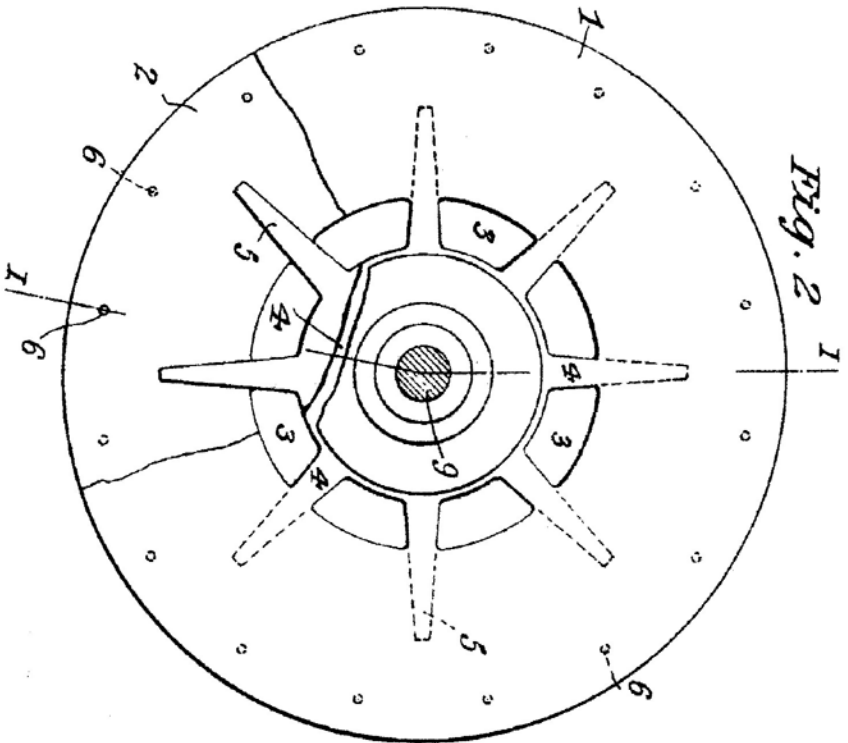
The main feature is in the extended arms of the central "Star Washers." In large diameter runners most of the power transfer between fluid and disc occurs at the outer perimeter of the discs after which the fluid is essentially "dead" and needs to be removed from the runner with the assis-



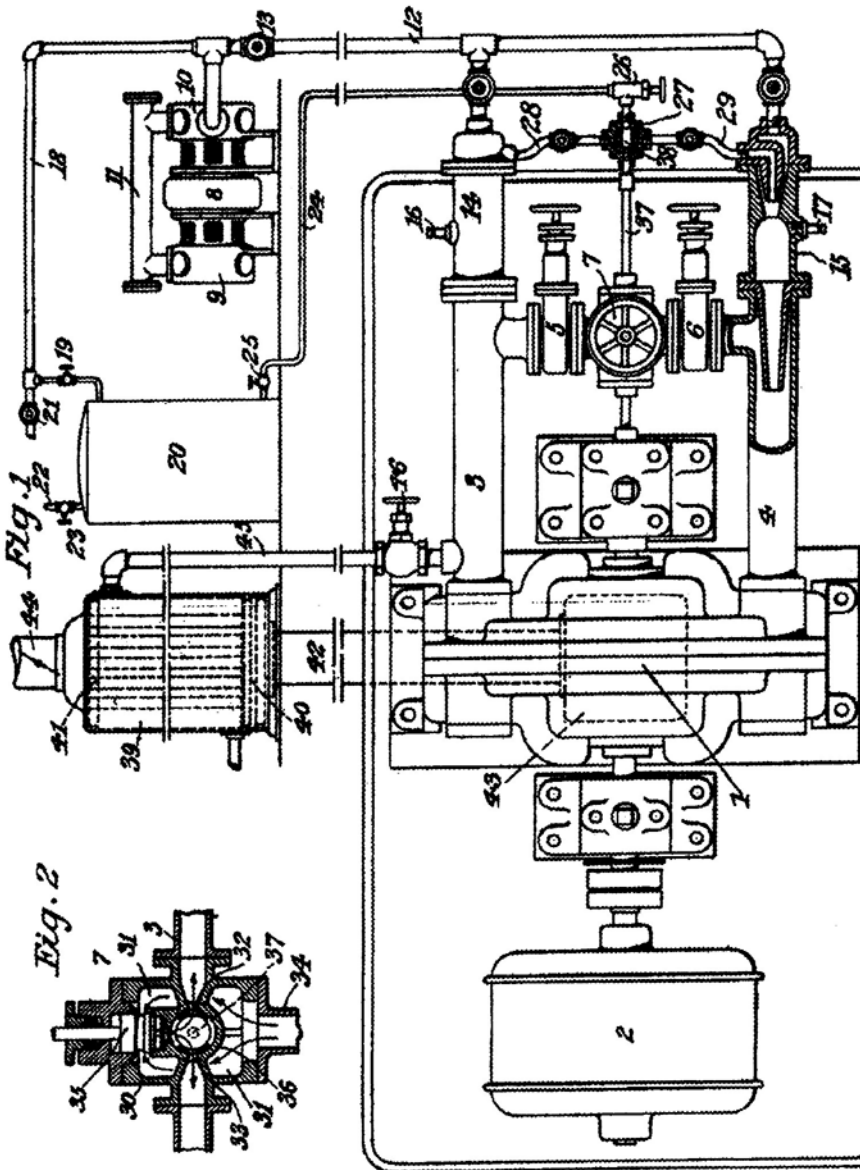
tance of the extended star washers. Note that only the outer perimeter of the disc is polished for better adhesion. The inner diameter roughened to discourage clinging of the depleted fluid and assists in its expulsion. This method is used for large diameters only.

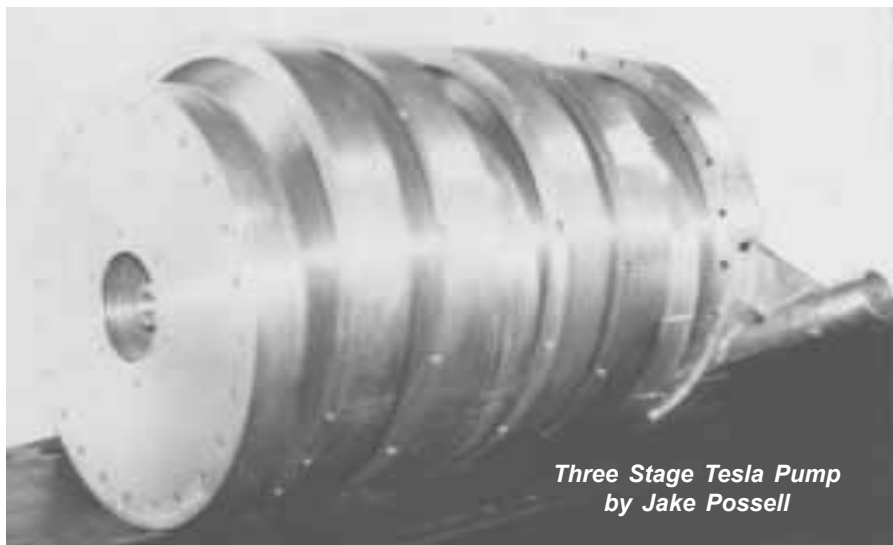


Improvements in the Construction of Steam and Gas Turbines.



Improvements in the Construction of Steam and Gas Turbines.





*Three Stage Tesla Pump
by Jake Possell*

“This is a disassembled three stage all aluminum bladeless vacuum pump. The vacuum is amplified from one stage to the next creating a very high vacuum output. This pump was installed at a dental office employing 50 dentists and serves as a vacuum source for all 50 dental offices in the building. The quality that is so unique is that contaminants do not cause havoc in this vacuum pump as they do in conventional vacuum pumps that operate with a piston or sliding vane. To demonstrate the effectiveness of the bladeless pump, a salesman will take a hand full of long nails and allow them to be sucked into the intake of the pump. These nails go through the pump without damaging it in any way!”

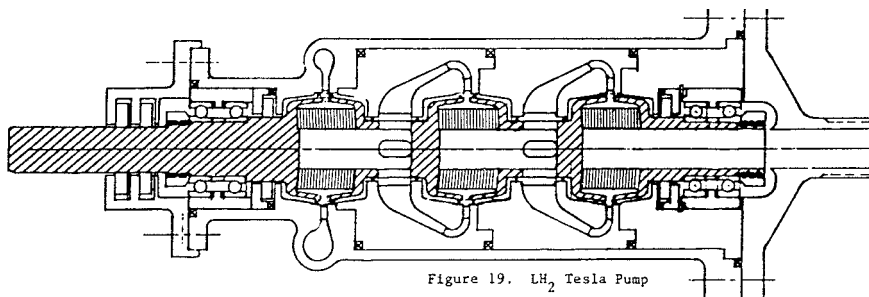


Figure 19. LH₂ Tesla Pump

The drawing of a multistage Tesla pump above is from literature by Aerojet describing various pumps used to compress liquid hydrogen. It is pictured here only slightly smaller than actual size. The Tesla device is reported to develop a pressure in excess of 10,000 PSI. Notice the volute housing on the output stage of both pumps.

Production of High Vacua.

179,043 COMPLETE SPECIFICATION

1 SHEET

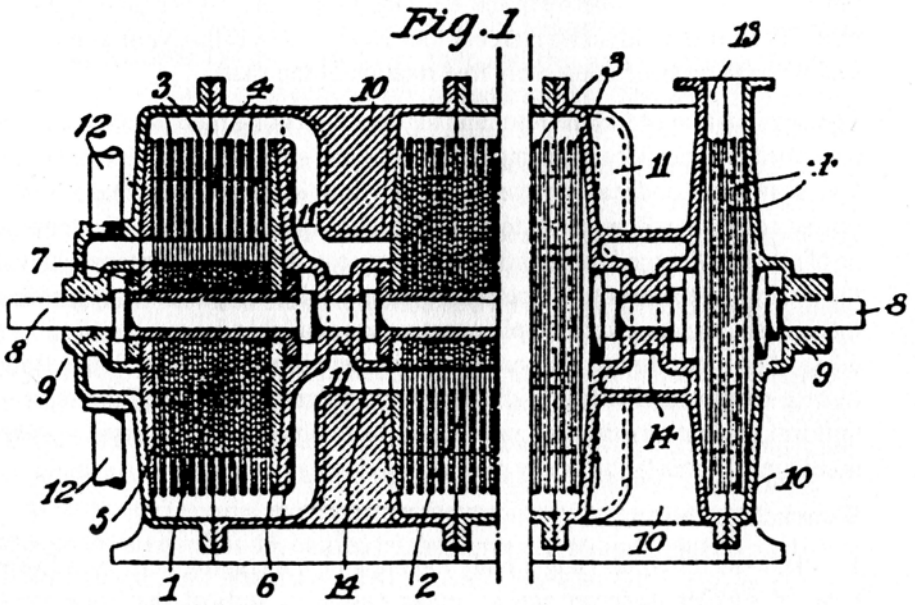
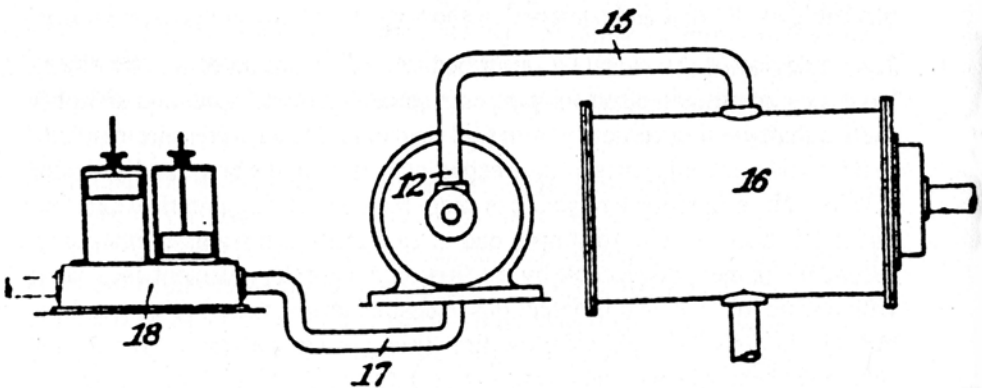
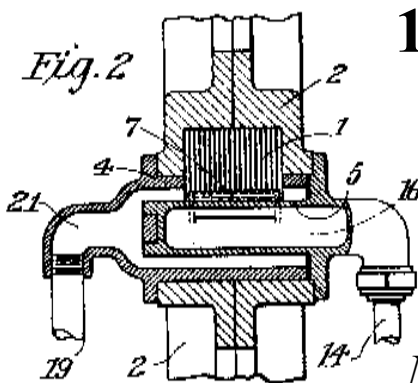
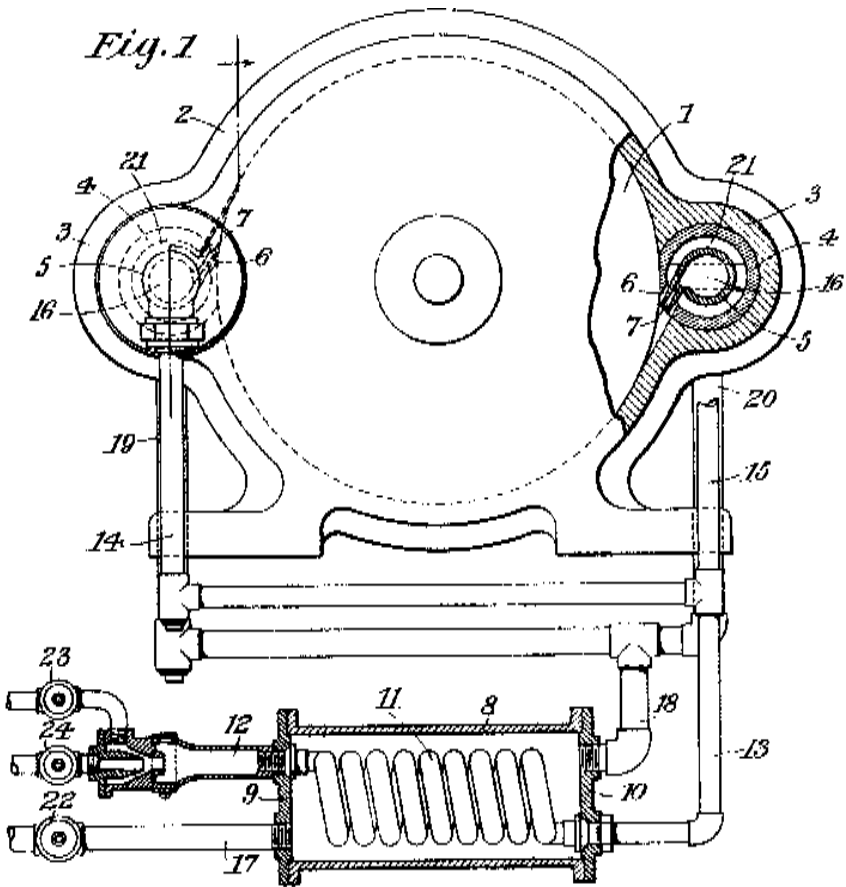


Fig. 2



Improved Process of and Apparatus for
Deriving Motive Power from Steam

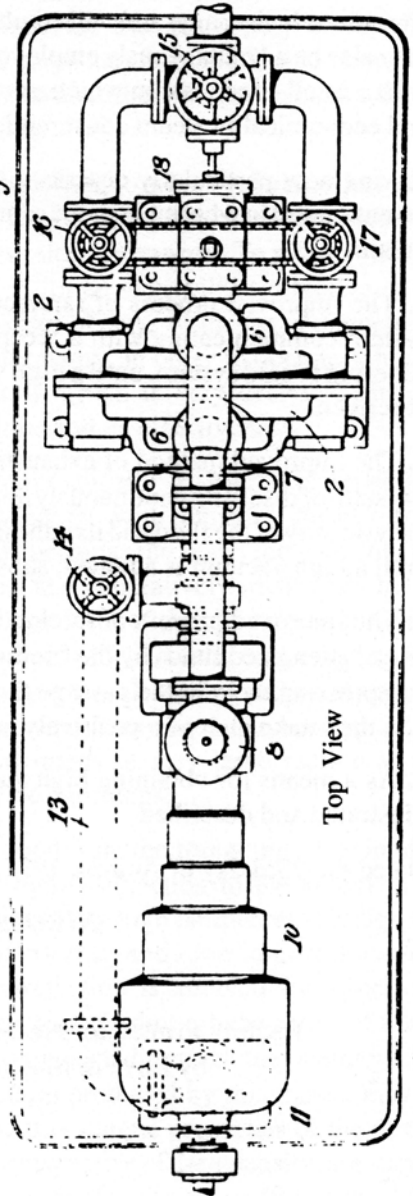
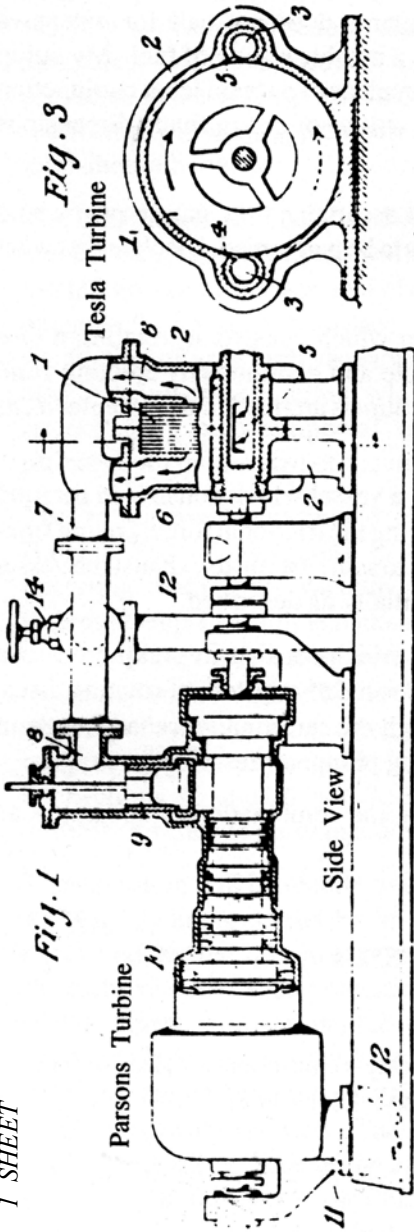


186,084

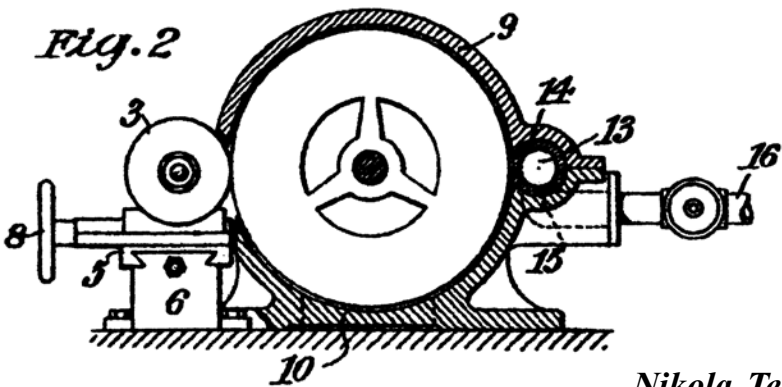
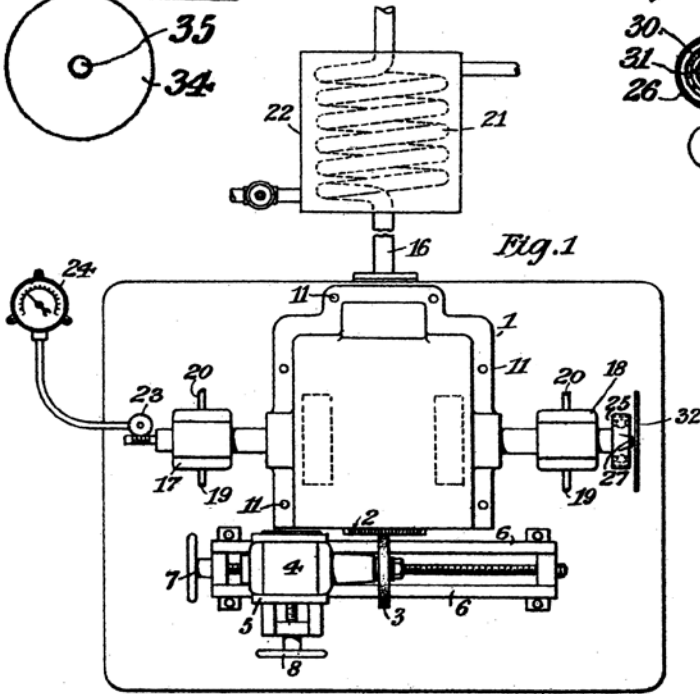
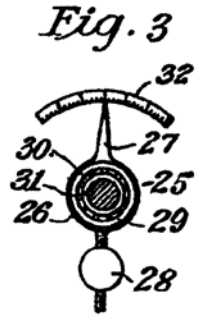
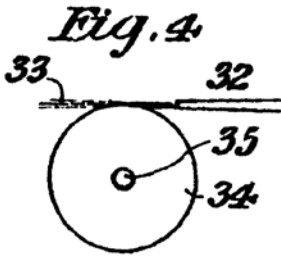
Nikola Tesla

Power by Elastic Fluid Turbines

174,544 COMPLETE SPECIFICATION
1 SHEET



Process of and Apparatus for Balancing Rotating Machine Parts



Jan. 3, 1928.

1,655,114

N. TESLA

APPARATUS FOR AERIAL TRANSPORTATION

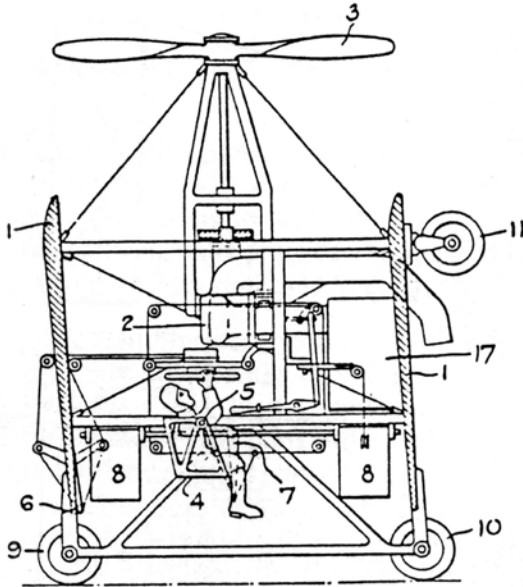


FIG. 1.

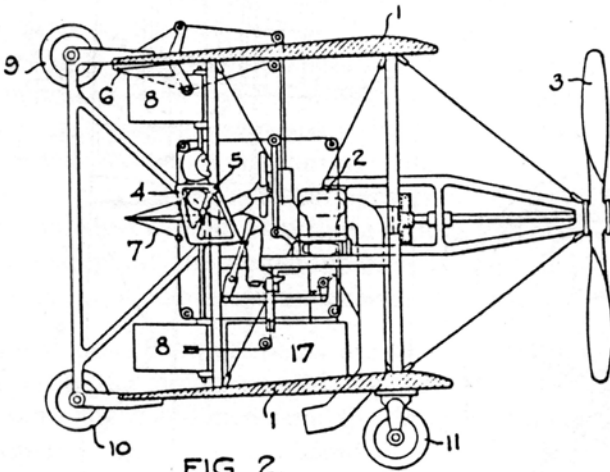


FIG. 2.

INVENTOR.
NIKOLA TESLA.
BY *Alfred K. Kacober*
ATTORNEY.

AERIAL TRANSPORTATION

Jan. 3, 1928.

1,655,114

N. TESLA

APPARATUS FOR AERIAL TRANSPORTATION

Filed Oct. 4, 1927

2 Sheets—Sheet 2

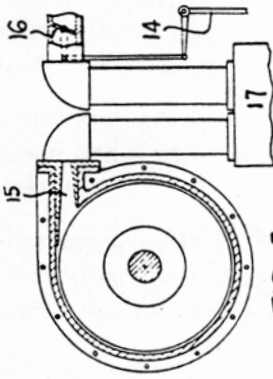


FIG. 5.

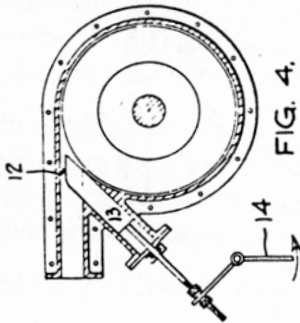


FIG. 4.

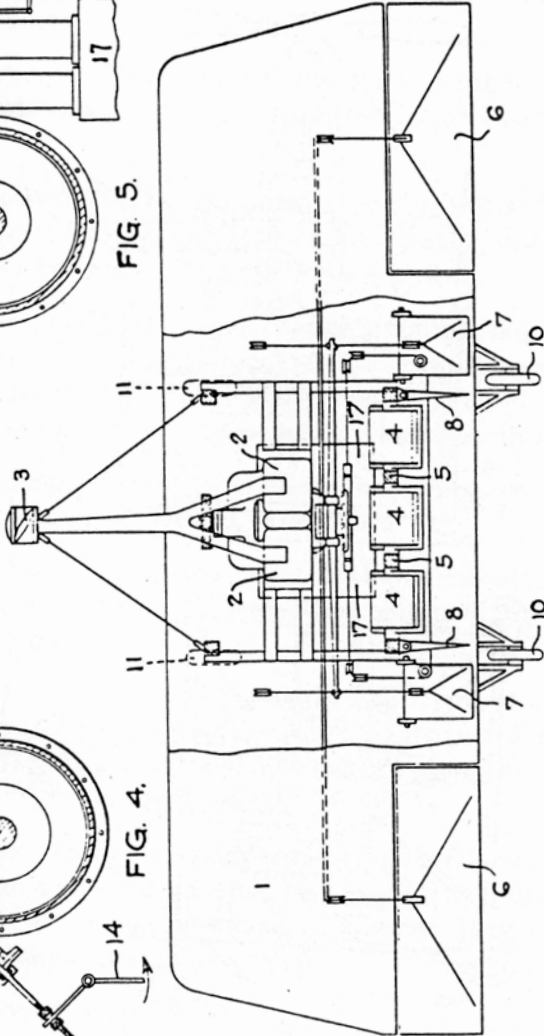


FIG. 3.

INVENTOR.

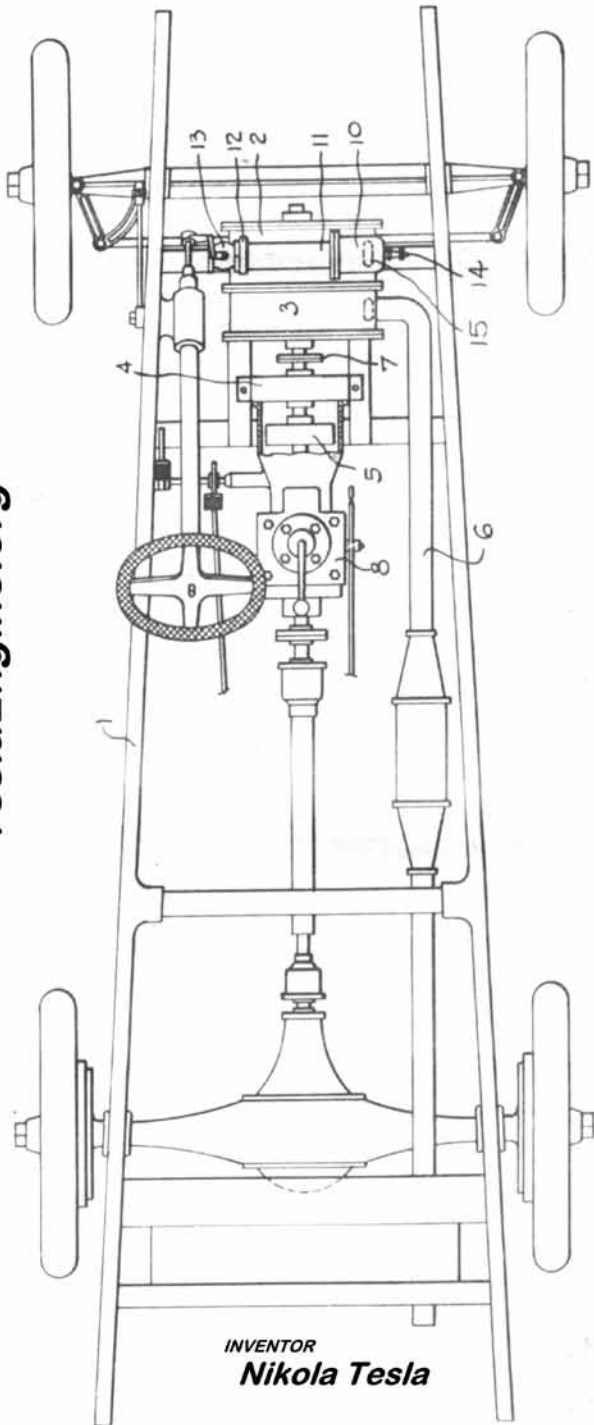
NIKOLA TESLA.

BY

John P. Tarbof

ATTORNEY.

TeslaEngine.org



INVENTOR
Nikola Tesla

United States Patent (*Unresolved*)

January 3, 1928

ECONOMIC METHOD AND APPARATUS OF OPERATING AUTOMOBILES AND THE LIKE

Method 244,345

Apparatus 244,346

WHAT I CLAIM AS NEW AND USEFUL IS:

1. The method of operating a self-propelled vehicle which consists in supplying the energy for small normal performances at substantially the highest efficiency of the prime mover, and that for the great occasional performance at a lower efficiency, as described.
2. The method of operating an automobile which consists in developing the energy for the small normal performances at approximately the efficiency of the propelling apparatus, and for the great occasional performances at a lower efficiency, as set forth.
3. The method of operating a self-propelled vehicle which consists in supplying the propulsive energy for the small normal and great occasional performances, respectively, at substantially the highest and a lower efficiency of the motor, thereby effecting a saving of energy, as described.
4. The method of operating an automobile which consists, in supplying most of the time the power consumed in the small performances with high efficiency, and that used up during short periods in the great performances with a lower efficiency, thereby increasing the average economy of propulsion, as set forth.
5. The method of improving the fuel economy of a self-propelled vehicle in long service which consists, in supplying the energy for the small normal, and great occasional work of propulsion, respectively, at a high and a lower efficiency, as described.
6. The improvement in the art of automobile propulsion which consists in the use of a motor of high light load efficiency and very great overload capacity.
7. The improvement in the art of operating automobiles and the like which consists in effecting the propulsion by a turbine of high light load efficiency and very great overload capacity.
8. The improvement in the art of operating automobiles and the like which consists in the employment of a motor possessed of efficiency char-

acteristics substantially opposite to those of a reciprocating engine, as set forth.

8. The improvement in the art of operating automobiles and the like which consists in the employment of a motor possessed of efficiency characteristics substantially opposite to those of a reciprocating engine, as set forth.

9. The improvement in the art of automobile propulsion which consists in the use of a motor of very great overload capacity and operating with substantially the same high efficiency at all loads, as described.

10. The improved method of operating automobiles and the like which consists in controlling the primary energy supplied to the propelling apparatus and thereby causing the same to work with high efficiency at all loads, as set forth.

APPARATUS FOR OPERATING SELF-PROPELLED VEHICLES

Be it known that I NIKOLA TESLA, a citizen of the United States, of the Borough of Manhattan, City, County and State of New York, have invented novel Apparatus for Operating Automobiles and the like, of which the following is a true and accurate specification.

This application is a division of another of the same date bearing the title "Method of Operating Self-Propelled Vehicles" and is made pursuant to the rules of the Patent Office, its purpose being to describe and claim apparatus invented by me for carrying the method therein disclosed into practice.

The invention consists in a combination of parts operatively associated and comprising, a new exceptionally light and powerful motor, a fluid pressure generator of novel design for supplying the primary energy and means for regulating and controlling the same.

These and other constructive details are shown in the annexed drawing which will be hereinafter fully described.

In the present state of the art the performance of a car unavoidably involves great loss of energy owing to unfavorable characteristics of the universally employed reciprocating engine and peculiar exigencies of service. Due to numerous thermal and mechanical losses in itself and indispensable auxiliaries, such as motor has a very low efficiency at light load and as, for most of the time, the travel is confined to good and fairly level roads and moderate speeds imposed by law, when the work of propulsion is relatively insignificant, the average economy obtainable with the usual equipments is necessarily small. The chief drawback under the existing conditions is that, as a rule, the motive power is applied in a wasteful manner for long periods which may aggregate from ninety to ninety-five percent of the whole time

Tesla Engine Builders Assoc.
TeslaEngine.org

Eleven Inch Runner

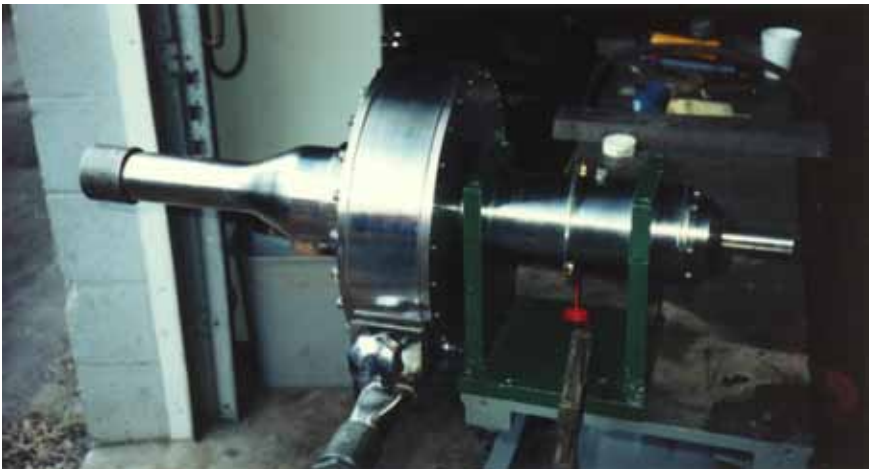
Tesla Turbine

Variable Nozzle

Tesla Turbine

*Highest Efficiency
In Its Class*

First turbine ever constructed using Tesla's variable nozzle design described in previous patent for Aerial Transportation, after founding of Tesla Engine Builders Association in 1993.



2,000 ARE PRESENT AT TESLA FUNERAL GREAT IN SCIENCE ATTEND

*Cathedral of St. John the Divine Is Scene of Yugoslav State Function for Scientist
Ambassador Fotich Heads the Procession of Mourners — Bishop Manning Assists*



Inventors, Nobel Prize winners, leaders in the electrical arts, high officials of the Yugoslav Government and of New York, and men and women who attained distinction in many other fields paid tribute yesterday to Nikola Tesla, father of radio and of modern electrical generation and transmission systems, at an impressive funeral service in the Cathedral of St. John the Divine.

The service, conducted in Serbian by prominent priests of the Serbian Orthodox Church, was opened and closed by Bishop William T. Manning, assisted by Father Edward West, Sacrist of the Cathedral. The Serbian Orthodox Office for the Dead was said by the Very Rev. Dushan Shoukietovich, rector of the Serb Orthodox Church of St. Sava, who officiated in the name of the Serbian Orthodox Church in America.

City is Represented

More than 2,000 persons attended the service. The city was represented by Newbold Morris, President of the City Council, who headed the list of honorary pallbearers. Other honorary pallbearers included Dr. Ernest F.W. Alexanderson of the General Electric Company, inventor of the Alexanderson alternator; Professor Edwin H. Armstrong of Columbia University, inventor of frequency modulation and many other important

A TRUE ENERGY AWARENESS

In closing, a short biography of a researcher is presented who was able to make the transition from closely held, though erroneous, ideas to a True Energy Awareness.

The discover of deuterium, or heavy water, Nobel prize laureate Professor Harold Urey (1893 -1981), was one of the first and staunchest supporters of the use of nuclear power for electrical energy production. He was one of the prominent scientists to witness the hydrogen weapons test conducted at Bikini Atoll.

Professor Urey was dedicated to an effort that would exploit this power for the benefit of man and spearheaded a campaign devoted to the rapid establishment of nuclear power for electrical generation.

As one of the worlds most respected spokesman for the nuclear theme, it is significant to note that by the early 1970's, after a spiritual and intellectual awakening, he was totally convinced of the folly of his previous convictions.

Warning bells rang in professor Urey's psyche as he realized that the nuclear poisons could not and were not to be contained. He predicted that this demon, which he had once embraced, would devastate all human life on the planet without even a single detonation of a nuclear device.

Professor Urey began to sound the alarm bells in the scientific community with a fervor unknown to his previous nuclear promotions.

His message, however, was falling on deaf ears.

Professor Urey explained that environmentally derived energy production in unlimited quantities had been proven a reality, therefore negating any need for atomic power on earth.

He accused the scientific community of being blind to the true and simple facts of energy, stating that nuclear scientists are like children not knowing the true value of currency. Thinking they are richer with many pennies, rather than a single piece of highly numbered paper.

Tesla's Engine is one of these highly denominated but ignored devices professor Urey was making reference to.

Professor Urey was, like Tesla, a scientist of the highest integrity. In both of these men's lives, truth reigned supreme over ego.

Quoting Tesla:

The scientists, from Franklin to Morse were clear thinkers and did not produce erroneous theories. The scientists of today think deeply instead of clearly. One must be sane to think clearly, but one can think deeply and be Quite Insane.



“Truth has no Special Time of its own.

Its Hour is Now — Always”

Albert Schweitzer