by having directly connected to the light of a single small fire.

The governor is driven by the weight of the governor, and is connected for the lamp is produced or regulated, and is constant. The governor is the electric device or machine by which the governor is the electric current is supplied to the lamp. The governor consists of the device that when the electric current is supplied to the lamp, the governor consists of an electric current that when the light produced is regulated to prevent a reduction of the electric current, the governor is regulated, and the lamps are regulated. In considering the electric current, the governor is regulated, and when the electric current is regulated, the lamps are regulated.

GENERAL PRINCIPLES

PRINCIPLES OF CONSTRUCTION

ELECTRIC-Heating Equipment

Locomotive Heating Systems
Steam Turbine

A steam turbine is a form of engine by which the energy of steam is converted into work and produces rotary motion of a shaft. In the ordinary steam engine, this is done by means of a piston and connecting rod, a crank, and a flywheel. The steam impulse is communicated to the driving wheel and causes it to rotate continuously in one direction.

4. Principles of Steam Turbine. A steam turbine is a form of engine by which the energy of steam is converted into work and produces rotary motion of a shaft. In the ordinary steam engine, this is done by means of a piston and connecting rod, a crank, and a flywheel. The steam impulse is communicated to the driving wheel and causes it to rotate continuously in one direction.

Steam END

5. A diagram showing the principle of the steam turbine is given in Fig. 1. The wheel is set in motion so as to discharge the steam against one edge of the buckets, as shown in Fig. 2. The steam strikes down into the hollow of the bucket, forces the bucket to turn, and escapes at the opposite side.

6. Diagram. The principle by which the steam turbine works is shown in Fig. 1. A main thing is that the steam nozzle is placed directly in line with the center of the wheel. The steam strikes the buckets with considerable force and causes the wheel to rotate rapidly in the direction of the arrow.
The current in the wire will have the direction shown by the arrows. Hence the two wires will exert magnetic influence on each other, but in opposite directions. This produces the effect shown in the figure. The two wires repel each other, and the force of repulsion is greater when the distance between them is smaller. This is because the magnetic field is stronger when the distance between the wires is smaller. The force of repulsion is greatest when the wires are in a straight line, and decreases as the wires are bent or twisted.
15. Closed and Open Circuits - The Path in Which Electric Current Flows is called a Circuit. If the path is broken, the electric current does not flow, and the circuit is said to be open. If the path is continuous, electric current will flow, and the circuit is said to be closed.

16. Simple Form of a Contact - The Poles of a battery are connected by means of wires to the terminals of another piece of apparatus, which is called a contact. The contact is the point where the wires are connected to the apparatus. The contact is made by squeezing the wires together tightly, and the current flows through the contact. The contact is usually a spring that is compressed to make contact with the wires.

17. The Interchange of Energy - In a 3-phase motor, the current changes direction 3 times per cycle, and the motor rotates. The energy is transferred from the current in the wire to the magnetic field in the motor, and then back to the current in the wire. This interchange of energy is what makes the motor work.

18. Contactors and Relays - A contactor is a device that is used to switch circuits. It is made of a coil that is connected to the circuit, and a set of contacts that are connected to the load. When the coil is energized, the contacts switch the load to a different circuit. A relay is a device that is used to switch circuits, but it is made of a coil that is connected to a control circuit, and a set of contacts that are connected to the load. When the control circuit is energized, the contacts switch the load to a different circuit.
LOCOMOTIVE HEADLIGHTS

21. Wiring Diagrams.—To show the various parts of an electric circuit and the apparatus connected therewith, it is customary to use what is called a wiring diagram. For a simple diagram, such as that shown in Fig. 10, the wires are represented by lines, and the parts of the apparatus are indicated by various symbols. This diagram shows a simple closed circuit consisting of a source of electricity, a switch, and a light bulb.

22. Single-Throw and Double-Throw Switches.—A simple diagram of a single-throw and double-throw switch is shown in Fig. 11 (a). The switch consists of a handle mounted in a frame, to which are attached two metal posts, and a handle d of the switch is made up of two parallel rods, so that it can be moved in either direction.

23. Fuses.—A wire of a certain size can transmit a certain current, but the current is increased by adding a certain amount of resistance. This is done by the use of a fuse, which is a small piece of wire or a piece of metal that melts at a certain temperature. When the current becomes too great, the fuse opens the circuit and prevents damage to the apparatus.

24. Other IMPORTANT POINTS.—The diagram shows that the light bulb is connected in series with the switch and the current flows through both the switch and the bulb. When the switch is closed, the current flows through the bulb and lights it. When the switch is opened, the current stops and the bulb goes out. This is an example of a simple circuit, which is the most common type used in electrical work.
The insulated wires may readily be seen and the ends of the coils that lie in these slots are smoothly wrapped with a}

The diagram on the left shows the construction of the armature. The armature is wrapped with insulated wire and has a shaft. The commutator is also shown, consisting of flat bars that are insulated from each other.

On the right, there is another diagram showing a different type of armature. This one is wound with wire and has a commutator with brushes.

The text explains the function of the armature and commutator in electric generators. It describes how the armature rotates and how the commutator transfers the electrical current from one coil to another.

The commutator is a device that transfers the current from the armature to the external circuit. It consists of a series of segments that rotate with the armature. As the armature rotates, the commutator segments interrupt the current flow in a specific order, allowing the current to flow through the external circuit.

The text also mentions that the current will pass from one pole to the other through the armature and commutator.

The diagrams illustrate the physical components of an electric generator, including the armature, commutator, and brushes. These components work together to convert mechanical energy into electrical energy.
38. GENERATOR.—The generator is a two-pole machine, the poles being formed in the main casing, as opposite.

36. GEORGIA.—The generator is of the same type as the motor.

The drawing shows the generator and motor in section, and also a side elevation of the same. The generator is shown to be of the same type as the motor, with the same number of poles and the same number of slots in each pole. The generator is shown to be of the same type as the motor, with the same number of poles and the same number of slots in each pole.

39. TANK.—A vertical section of the generator and motor is shown in Fig. 36. The generator and motor are shown to be of the same type as the motor, with the same number of poles and the same number of slots in each pole. The generator is shown to be of the same type as the motor, with the same number of poles and the same number of slots in each pole.

27. WATER AND WIREWAYS.—If the number of volts and the number of amperes are multiplied together, the product is the number of watts, which is the work done in the motor, and is the work done in the generator, multiplied by the effective voltage. If the number of amperes is multiplied by the effective voltage, the product is the number of watts, which is the work done in the motor, and is the work done in the generator, multiplied by the effective voltage.
LOCOMOTIVE HEADLIGHTS

Each pole is approximately square in section and its inner face is curved so as to fit cleanly around the armature. A field coil is also made in square form, slipped over each pole and is held in place by a steel retainer that passes through the pole pieces. The armature is constructed of one piece of field coils that is shown at 6. The armature is then slipped off the shaft, the coil 6 after the pole piece has been removed. Thus, in case the armature must be removed for repair or replacement, the field coil can be slipped out and replaced by a new one, enabling the

These brushes, one on each side of the commutator, are pressed against the surface of the commutator by the coil springs. One spring presses the brushes tightly against the commutator and is held in place by a spring clip at the bottom of the commutator. A steel cover is used to allow inspection of the commutator and brush holder. The armature of this eighteen slots in which are the armature coils. These coils are secured in place by insulated wires, and a heavy protector of metal is fitted over the
In the prime head, where the governor valve is located, the impulse head, at a point where the pressure to the center of the valve is less than the pressure to the edge of the valve, the steam is condensed in the exhausting passage. In leaving this area, the steam enters the exhaust passage or chamber, which is connected to the opposite side of the engine, to be exhausted. The steam is distributed into the direction of the engine shaft, and the exhaust steam is directed in the direction opposite to the main impellers, where it re-enters the exhaust passage, to be exhausted into the exhaust chamber.
Fig. 19

LCOMOTIVE HEADLIGHTS

After passing into the piston nozzle, the steam continues along the passage into the main nozzle and then to the turbine wheel, as already explained in connection with Fig. 17.

36. Governor—The entire governing device of the Superheated Steam Turbine Governor is shown in section in Fig. 19. The governor bell is carried on the turbine end of the main shaft. It consists of a body which is screwed on the shaft and that carries the weights and the short arms, as shown in Fig. 19. The weight is made of the same material as the rest of the governor. A pin on the arm of the body of the governor passes through the center of the body and under the side of the head of the pin. When the valve that is screwed to the right. It is held in place by the spring press the pin toward the right.

37. When the turbine is running, the governor weight carries with it the arm and the short arm. The spring press against the jet, against the head of the pin. The weight is screwed on the shaft and then to the turbine wheel, as already explained in connection with Fig. 17.

38. Governor Lever. The end of the pin F, Fig. 19, bears against a steel ball held in the center of a lever. The lever is pivoted on a pin G at the upper end, the pin being held in a threaded stud that may be screwed into or out of the lever to control the speed of the turbine as now be explained.

In other words, if the speed gets too low, the weight is raised by the spring and pushes the pin F to the right. If the speed falls below the regular running rate, the spring press the pin toward the right. It is held in place by the spring press the pin toward the right.
LOCOMOTIVE HEADLIGHTS

44. Brush Holders—A view of the commutator end of the generator coils shows (in Fig. 20) the brush holders and brushes, which are located in the same manner as in the brushes and holders of the dynamo. The brushes are supported in a slot in the commutator by a hat spring 4.

45. Sunbeam Headlight—The arrangement of the various parts of a Sunbeam 12 V. steam locomotive headlight is shown in Fig. 22 (a). The lens is made of glass and is held in place by a fitting, and the various connections being commonly supported by the post 6, which is carried by the slide 7. The head of the lamp is held securely in place by a nut 8, which is screwed into the top of the case and is turned to hold the head against the pressure of the spring 9.

The speed of the main shaft must be 2,000 revolutions per minute to maintain the main field; but the voltage may be increased or decreased by raising or lowering the speed of the motor. The speed is controlled by the governor, which is adjusted to suit the requirements of the service. The hand wheel 10 is turned by the operator to increase or decrease the speed. The hand wheel 10 is turned by the operator to increase or decrease the speed.
LOCOMOTIVE HEADLIGHTS

10. **Reflector and Lamp Assemblies**—The purpose of the reflector is to catch the light from the lamp and throw it forwards in parallel lines. In order to obtain this result, the lamp must be fixed to the reflector, the assembly is firmly fastened to the bracket, as shown in Fig. 23. The lamp is held in a certain position near the back of the reflector or to the left of it. To prevent the lamp from moving, the lamp is held in place by the reflector, which is fastened to the lamp by two screws. The springs inside the reflector are used to prevent the lamp from moving, and the wires are fastened to the reflector, which allows the lamp to be moved from side to side.
For as shown in Fig. 22 (a), the reflector is supported at the rear by being bolted to the side of the lens. A brace runs the rear end of the reflector for longitudinal strains. The reflector is adjusted by lengthsening the post to fit. The rods are formed grips by which the slip may easily be pulled out of the headlight case without strain on the reflector.

The slip end of the reflector 1 is slotted so as to allow for the adjustment of the reflector.
51. The turbine wheel \( I \), Fig. 25, rotates inside the changes bar \( \delta \), which also contains the governing mechanism. It is to the exhaust. But for the use of the reversing buckets and two rows of buckets it is made to do double duty. The governor parts are clearly shown. The semi-cylindrical weights \( e \) are on opposite sides of the shaft and are fastened by \( f \). The collar \( g \) and \( h \) are the main parts of the spring \( a \), which is held firmly in the main \( i \). One of the two screws by which this arm is held to the wheel is shown at \( j \).

**Locomotive Headlights**

31. The piece shown in (a). This piece, when in place, occupies one piece, and the inside edges of the row of buckets a which are curved, the position shown in (b). The steam escaping from the nozzle c strikes the inside edges of the row of buckets at the position shown. It escapes from the row of buckets and simply proceeds to the direction of the steam and turn in the pockets \( d \) of the outer edge of the buckets. These buckets are \( u \) shaped and simply proceeds to the direction of flow of the steam and turn in the pockets \( d \) of the outer edge of the buckets. On leaving these buckets at the inner edges, the steam pieces...
The position valve is down. The stroke is restricted south of the governor. When the valve is down, the pressure due to the governor is reduced. The stroke is increased. When the valve is up, the pressure due to the governor is increased. The stroke is decreased. The pressure due to the governor is reduced. The stroke is increased. The pressure due to the governor is increased. The stroke is decreased.

**Governor Action**

The position of the valve is changed. The stroke is increased. The pressure due to the governor is reduced. The stroke is decreased. The pressure due to the governor is increased. The stroke is increased. The pressure due to the governor is reduced. The stroke is decreased. The pressure due to the governor is increased. The stroke is decreased. The pressure due to the governor is reduced. The stroke is increased.

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**Governor Action**

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The speed of the engine-generator will increase by reason of the
increase in the governor valve needs admittance. If the
valve is increased, the speed will increase. If the valve is
reduced, the speed will decrease. The speed at which the
engine-generator will deliver its rated capacity of 500
horsepower may be regulated by adjusting the
speed control valve. The speed control valve is
located on the governor armature. The speed of the
generator is controlled by the
speed control valve. The speed of the generator is
controlled by the speed control valve. The speed of the
engine-generator is controlled by the speed control valve.
38. **Locomotive Headlights**

29. **General Arrangement—Wires of opposite sides of the current conductor are shown in Fig. 20 (a) and (b). The current enters at the bottom of the lamp and escapes through the lamp base, and the same current flows through the lamp base and escapes to the wires.**

30. **Details of construction—A sectional view of the lamp is shown in Fig. 21. The lamp is made of two parts, a base and a lamp, and is held together by two metal rings. The lamp is made of a metal shell, and the base is made of a metal plate.**

31. **Locomotive Headlights**
LOCOMOTIVE HEADLIGHTS

A vertical screen is placed to prevent loss of heat to the floor. The body is of the steam chest and is made of cast iron. The steam chest is made of cast iron and is made to fit the chamber of the cylinder. The steam chest is made of cast iron and is made to fit the chamber of the cylinder. The steam chest is made of cast iron and is made to fit the chamber of the cylinder. The steam chest is made of cast iron and is made to fit the chamber of the cylinder.
The diagram illustrates the construction of a steam engine. The steam is admitted through the nozzle and expands through the valve, causing the piston to move. The steam is then condensed and returns to the boiler through the condenser. The steam pressure is controlled by the governor, which adjusts the throttle valve to maintain a constant speed.

The text accompanying the diagram discusses the principles of steam engine operation and the various parts involved. It explains how the steam pressure affects the movement of the piston and how the governor ensures that the engine runs at a steady speed.
71. **Exhaust, Fitting and Drains**—An exhaust pipe should be located near the bottom of the furnace. If the extra-gas lines to the exhaust chimney are properly designed, the exhaust pipe should be connected to the chimney opening. It is advisable to have a separate exhaust pipe for each room or apartment. A properly designed exhaust system should be installed in the building. A manhole or access door should be provided at the lowest point of the system. Location of the exhaust pipes should be such that the exhaust is not subjected to any objectionable air currents.

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**INSTALLATION AND OPERATION**

69. **Locating the Furnace Generator**—The location of the furnace generator should be selected with the furnace design in mind. A safe and accessible location should be chosen. The furnace should be located close to the boiler and should be protected from drafts. The walls should be constructed of non-combustible material. The electrical wiring should be concealed and protected. The furnace should be installed in a manner that will prevent any leakage of gas. The furnace should be equipped with a suitable air supply. The fuel should be stored in a safe and fireproof location. The furnace should be equipped with a combustion air supply. The gas should be turned on only after the furnace has been started. The furnace should be checked regularly to ensure proper operation.

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**Locating the Boiler**—The location of the boiler should be selected with the ease of operation in mind. The boiler should be located in a well-ventilated area. The boiler should be constructed of materials that are resistant to heat and corrosion. The boiler should be equipped with a safety valve. The flame should be adjusted to provide the correct amount of heat. The boiler should be insulated to reduce heat loss. The boiler should be equipped with a water level gauge and a thermometer. The boiler should be checked regularly to ensure proper operation.

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**Locating the Chimney**—The location of the chimney should be selected with the safety and efficiency of the furnace in mind. The chimney should be constructed of materials that are resistant to heat and corrosion. The chimney should be equipped with a damper. The chimney should be checked regularly to ensure proper operation.
LOCOMOTIVE HEADLIGHTS

33. If the locomotive is employed for through service, it carries a front headlight, the usual deck light, and a number of small headlight bulbs. A front headlight is a cylinder-shaped light that may be closed by a switch. The front headlight is on a circuit that is connected to the main circuit. Fig. 34 shows a typical circuit for this type of locomotive headlight. The deck light is the lamp on the front of the locomotive.

32. Headlight Wiring Diagrams. The wiring of the lighting system in a locomotive is shown in Fig. 35. The switch is on the top of the locomotive, and the lamp is on the front. The switch is turned on and off by the engineer. The lamp is powered by a battery and has a filament. The battery is charged by the generator.

73. Starting the Turbine. The turbine is started by opening the valve. The valve is opened, and the steam is allowed to pass through the turbine. The turbine is then started, and the steam is allowed to pass through the turbine.

41. Electric Wires. It is necessary to protect all wires leading to the headlight and to the various other lamps so that they may not be accidentally broken or become detached. The wires are held in place by the support of the handrail. The switch for the headlight is on a separate circuit. The switch is opened, and the current is allowed to pass through the headlight.

34. The exhaust pipe should be run along the deck to the top of the locomotive, and then bent backwards. To allow the steam to pass upwards and then bend backwards, it should be run downwards from the turbinis and then run horizontally again. A check drain pipe should be run down from the turbinis and then run horizontally again. A check drain pipe should be run down from the turbinis and then run horizontally again.
60. Introduction of Turbo-Generation—The purpose of the Padding around the floor is to keep the moisture of the boiler on any floor from seeping through and to prevent excessive humidity in the boiler house. Therefore, the floor padding should be kept in good repair and replaced if necessary.

79. Electrical Piping—The purpose of the Padding around the floor is to keep the moisture of the boiler on any floor from seeping through and to prevent excessive humidity in the boiler house. Therefore, the floor padding should be kept in good repair and replaced if necessary.

78. Firing of Boiler—The purpose of the Padding around the floor is to keep the moisture of the boiler on any floor from seeping through and to prevent excessive humidity in the boiler house. Therefore, the floor padding should be kept in good repair and replaced if necessary.

77. Operation of Boiler—The purpose of the Padding around the floor is to keep the moisture of the boiler on any floor from seeping through and to prevent excessive humidity in the boiler house. Therefore, the floor padding should be kept in good repair and replaced if necessary.

76. Adjustment of Bell Poster—If the floor or any part of the Padding around the floor is to keep the moisture of the boiler on any floor from seeping through and to prevent excessive humidity in the boiler house. Therefore, the floor padding should be kept in good repair and replaced if necessary.
The method of lubrication and the kind of lubricant to be used will depend on the make of machine, and no fixed rule can be laid down. But, in any case, the recommendations of the maker should be followed.

81. Changing the Lubricant. In some makes of tur-}

82. Care of Commutator Brushes.—The surface of the commutator should be kept smooth, round, and true, so that excessive wear and sparking of the brushes may be avoided. If the face of the commutator becomes rough or scored, it may easily be"
57. COURT OF HEADING.—As the Boys are cleared, the
following order or procedure should be followed:

1. Clear the Boys. (a) Inspection of Upper: (p) Inspection of
   Gunwale; (q) Preliminary Inspection; (r) Final Inspection;

2.ニューク of Inspection.—To issue the clearance order
   after a sufficient time and notice may be given, in the
   examination of the different parts of the vessel, to be
   followed immediately by the Boys. A qualified officer
   should be present in charge of the Boys and to examine
   and report the Boys who are to be cleared.

3. The Boys should be cleared and in charge of the
   Boys in the Examination. (The Boys should be
   cleared and in charge of the Boys in the Examination.)

4. The Boys should be cleared and in charge of the
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   cleared and in charge of the Boys in the Examination.)

10. The Boys should be cleared and in charge of the
    Boys in the Examination. (The Boys should be
    cleared and in charge of the Boys in the Examination.)
94. Focusing the Headlights—The headlight should be properly focused. This may be done by throwing the beam of light against a wall where it may be observed. The lamp should be raised and lowered, and the reflector adjusted vertically until the beam is directed into the correct position. The lamp should then be adjusted horizontally until the beam is directed into the correct position. The reflector should be adjusted horizontally until the beam is directed into the correct position.

95. Shape of Reflectors—the reflector should have a parabolic shape, with the vertex at the point where the beam is directed into the correct position. The reflector should be made of a material that will reflect the light efficiently, such as glass or metal. The reflector should be placed so that the light is directed into the correct position.

96. Importance of Correct Focusing—It is important to have the lamp focused precisely at the focus of the parabola. If the lamp is not focused correctly, the light will be spread out and will not be directed into the correct position.

LOCOMOTIVE HEADLIGHTS

97. Pull out the side using the pulling piece and help for the pulling piece removal. All that is required to open the front door and pull out the side using the pulling piece and help for the pulling piece removal. Under no circumstances should the reflector be grasped with the fingers as it might injure the reflector and produce a burn. The glass globe of the lamp should be clean and the lens should be free from scratches and finger prints. In some instances glass reflectors are used.
98. Swimmer's Ten. — The ogee signs or keys in the front door of the bathhouse case is clear and smooth in hand.

Swell on the track. Carroll on the track.

99. Contour of a soft, diffuse light that enters the room. The light is not intense enough to produce the desired effect. One can only say that the light is diffuse enough to produce the desired effect.

Lamp. — If the room is properly lighted and the picture properly exposed, the picture will be almost perfect. If the room is not properly lighted and the picture improperly exposed, the picture will be almost perfect.
1. **Topographic Relationships**

To introduce the reader in the way the world is shaped by the laws of nature and the forces that govern it, we should start with the fundamental principles of geology. When the earth's crust is formed, it is subjected to the forces that shape it into the landscape we see today. These forces include the movement of tectonic plates, the action of water, and the effects of erosion. By understanding these processes, we can better appreciate the beauty and complexity of the earth's surface.

1. **Topographic Relationships**

In the introduction to the study of geology, it is important to understand the basic principles that govern the formation of the earth's crust. These principles include the laws of thermodynamics, the conservation of energy, and the principles of mechanics. By understanding these principles, we can better appreciate the natural processes that shape the earth's surface and the forces that govern its behavior.

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106. **Locomotive IV Adaptors**—If the engine is not equipped with a brake control, the brake will not operate unless the adiabatic is engaged. The brake control should be engaged only when the engine is in a riding position. The brake should be applied to the Adaptor In order to the engine is standing in a riding position, the brake should be engaged by a hand brake; and, if the brake is not engaged, the engine should be shut off.

107. **Locomotive Headlights**—If the engine is not equipped with a brake control, the brake will not operate unless the adiabatic is engaged. The brake control should be engaged only when the engine is in a riding position. The brake should be applied to the Adaptor In order to the engine is standing in a riding position, the brake should be engaged by a hand brake; and, if the brake is not engaged, the engine should be shut off.

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