

Feb. 23, 1926.

1,573,883

M. A. VINING
DYNAMO ELECTRIC PLANT

Filed June 2, 1921

3 Sheets-Sheet 1

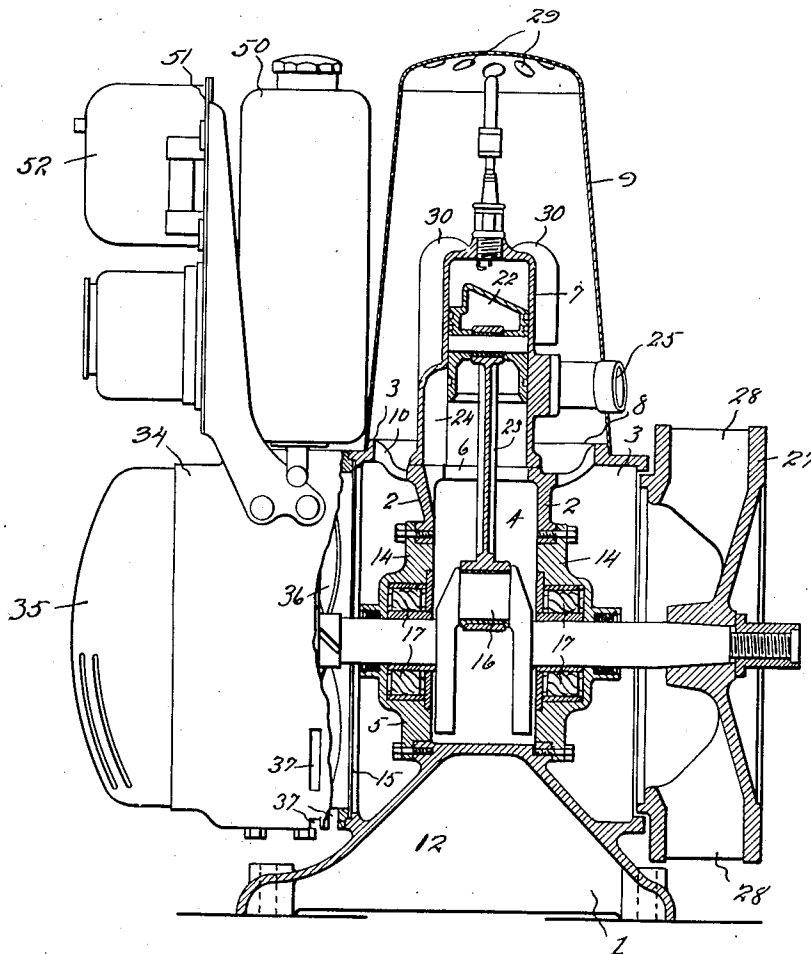


Fig. 1

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3 Sheets-Sheet 2

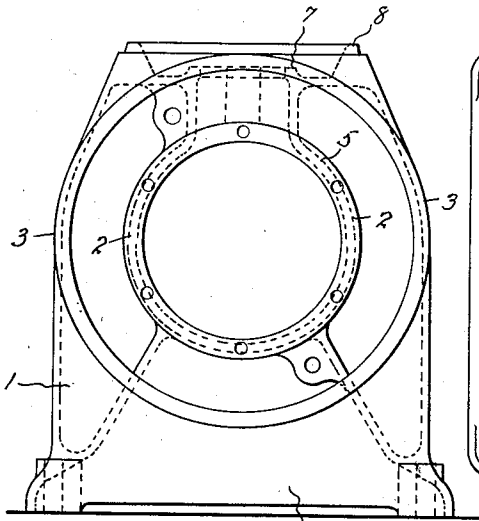


Fig. 2

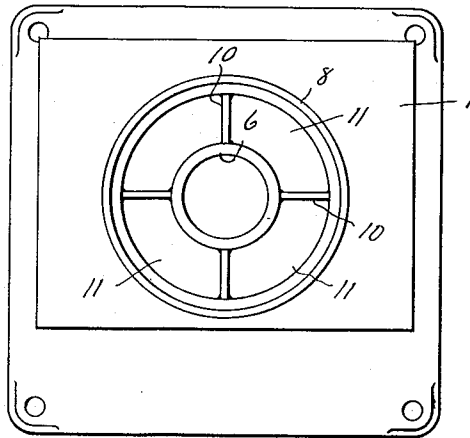


Fig. 3

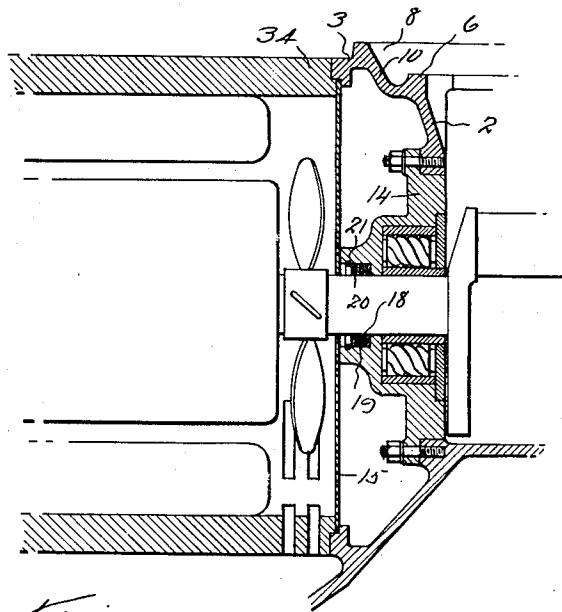


Fig. 4

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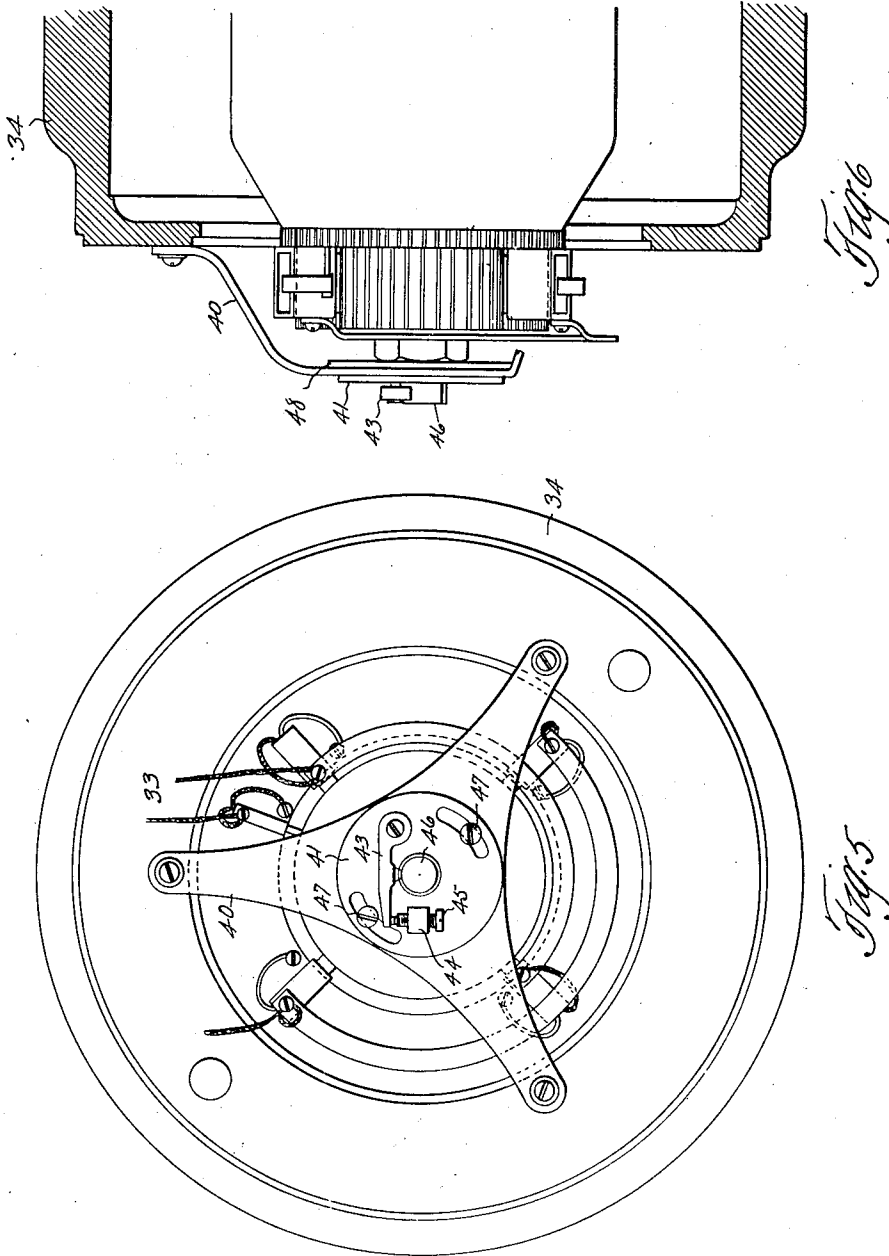
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DYNAMO ELECTRIC PLANT

Filed June 2, 1921

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

MERRITT A. VINING, OF ELYRIA, OHIO.

DYNAMO-ELECTRIC PLANT.

Application filed June 2, 1921. Serial No. 474,339.

To all whom it may concern:

Be it known that I, MERRITT A. VINING, a citizen of the United States, residing at Elyria, in the county of Lorain and State of Ohio, have invented a certain new and useful Improvement in Dynamo-Electric Plants, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to dynamo electric plants and has particular reference to plants of this type which employ an internal combustion engine directly connected to a generator and having the same mounted as a unit on a common base.

Some of the objects of the present invention are to provide a plant of this character which shall be simple in construction, inexpensive to manufacture and yet reliable and efficient in operation; to provide a plant of this character which shall be semi-automatic in control and hence easily operated by inexperienced persons; to provide a novel combined crank case and base which shall require a minimum of finished surfaces thereon; while further objects and advantages will appear as this description proceeds.

In the accompanying drawings wherein I have shown one form of my invention, Fig. 1 is a vertical sectional view through the plant; Figs. 2 and 3 are, respectively, an end elevation and top plan view of the base casting; Fig. 4 is an enlarged detailed sectional view illustrating certain features of construction where the generator is connected to the base casting; Fig. 5 is an end elevation of the generator with the outer casing cap removed, and Fig. 6 is a detail vertical sectional view through the outer end of the generator casing and showing the armature and associated parts in elevation.

Describing the various parts by reference characters, 1 indicates the combined crank case and base of the unit which is preferably in the form of a casting. This casting, as shown in Figs. 1-3, is provided with inner walls 2 and outer walls 3, said inner walls forming a part of the crank case and said outer walls being spaced therefrom to define an air space about the sides 4 and ends 5 of the crank case. At their upper ends the inner walls merge into a circular flange 6 to which the engine cylinder 7 is secured, while the outer walls merge into a larger flange 8 to which is fitted a cylinder hood 9. A plurality of arms 10 (Fig. 3) interconnect the

flanges 6 and 8 and define a plurality of air passages 11 therebetween. At their lower ends, the inner and outer walls merge into a hollow base portion 12 in spaced relationship, and intermediate of said flanges and base portion, said inner walls are provided with longitudinal openings therethrough which are normally closed by bearing caps 14-14. The outer walls are also provided with larger openings in alignment with the aforesaid openings and these larger openings are normally closed one by a fly wheel and the other by a disk 15 intersposed between the generator and the outer walls.

As shown in detail in Figs. 1 and 4, each bearing cap 14 is bolted to the inner walls 2 and cooperates therewith to form a fluid tight enclosure about the engine crank shaft 16 which is journaled in roller bearings 17-17 in said caps. A fluid tight seal is provided in each bearing cap about the crank shaft and said seal is preferably formed by inserting a plurality of cork rings 18 in a counterbore 19 formed in each bearing cap about the crank shaft 16. A metal disk 20 is next inserted and a spring retaining wire 21 serves to hold the parts in compressed relationship.

Referring now to Fig. 1, it will be seen that I preferably employ a two-cycle air cooled engine which is of the usual type and comprises the cylinder 7 having a piston 22 slidably mounted therein and connected by means of a connecting rod 23 to the crank shaft 16. The explosive mixture is drawn in through an intake pipe (not shown) into the crank case where it is compressed by the downward motion of the piston and forced up through the bypass 24 into the engine cylinder, the exhaust gases being forced through the exhaust opening 25 in the usual manner. A fly wheel 27 provided with a plurality of radial fan blades 28 is mounted on one end of the crank shaft and is disposed in the forward opening defined by the outer crank case walls 3. The fly wheel is adapted to draw air down through openings 29 formed in the top portion of the cylinder hood 9 and this air draft passes over the cylinder cooling fins 30 and thence between the inner and outer walls of the crank case and out the fly wheel. In this connection, it will be noted that the air passing over the cylinder becomes heated and hence cools into contact with the crank case and im-

parts some of its heat thereto which serves to facilitate the vaporization of the incoming explosive charge. It will thus be seen that with the ventilating system employed I distribute the engine heat to the best advantage and not only cool the cylinder but utilize the heat therefrom for vaporizing the incoming charge and also cool the air which is expelled from the fly wheel.

The end of the crank shaft opposite the fly wheel is connected to the armature shaft of a generator which is preferably of the shunt wound type and provided with a third brush 33 (Fig. 5) for supplying current to the engine ignition system. The generator casing 34 is mounted on the base casting 1 and is connected to the peripheral portion of the rear opening in the outer walls thereof, as clearly shown in Figs. 1 and 4. The commutator end of the generator is normally closed by a perforated cap 35 and the armature shaft is fitted with a suitable fan 36 for drawing the air through the perforated cap and over the generator windings, the air being expelled through suitable slotted openings 37 formed on the lower half of the generator casing. The disk 15 dividing the generator casing and base casting serves to prevent the generator cooling draft from entering and admixing with the cylinder cooling draft where it would tend to cool the crank case walls and especially be apt to cause a cooling effect on one side of said crank case which would prevent efficient vaporization of the explosive charge in the crank case.

As shown in Figs. 5 and 6, the commutator end of the generator is provided with a suitable bracket 40 on which is mounted a rotatably adjustable disk 41. This disk mounts a pivoted contact arm 43 and a stationary post 44 which has an adjustable contact screw 45 threaded therethrough and disposed in operative relation to the contact carried by arm 43. A stud shaft 46 projects from the end of the armature shaft and is provided with a cam surface which is adapted to contact with arm 43 to cause the contact points to open and close and hence make and break the primary circuit of the engine ignition system at the proper time. The disk 41 may be rotated in either direction by loosening screws 47—47 and thus timing of the engine is easily accomplished. A condenser 48 which is shunted across the contact points is located on the rear side of the bracket 40.

A fuel tank 50 is mounted on the generator casing and has operative connection with the engine. The switch board 51 is also mounted on the generator casing and is provided with the usual instruments including a starting and stopping switch 52, of any approved design.

From the foregoing description it will be

obvious that I have provided a simple and easily constructed device. The base casting requires a machined surface only about the periphery of each of the bearing cap openings, the flange to which the engine cylinder is attached, and the generator opening. The engine may be easily assembled or dismantled and timing thereof is easily accomplished by removing the generator cap 35 to expose the timing mechanism. In practice the engine and associated parts are lubricated by mixing a certain quantity of lubricant with the fuel. Starting and control of the plant is accomplished through an electrical system described in my copending application above referred to.

Having thus described my invention, what I claim is:

1. In a device of the character described, the combination with an engine having a crank case and base and including inner and outer walls arranged in spaced relationship, said inner and outer walls being provided each with a pair of oppositely disposed openings therein, bearing caps closing each of the openings in said inner walls, means closing one of said openings in the outer walls, and a fly wheel rotatably mounted in the other of said openings.

2. In a device of the character described, the combination with an engine having a crank case and base and including inner and outer walls arranged in spaced relationship, said inner and outer walls being provided each with a pair of oppositely disposed openings therein, bearing caps closing the openings in said inner walls, an electric machine mounted on said outer walls and closing one of said outer wall openings, and a fly wheel rotatably mounted in the other of said outer wall openings.

3. In a device of the character described, the combination with an engine having a crank case and base and including inner and outer walls arranged in spaced relationship, longitudinal openings extending through said inner and outer walls and arranged in coaxial alignment, a bearing cap closing each of said inner wall openings, a crank shaft journaled in said bearing caps and extending through said outer wall openings, a fly wheel mounted in one of said outer wall openings, a partition closing the other of said outer wall openings, and an electric machine mounted on said outer walls and operatively connected to said crank shaft.

4. In a device of the character described, the combination with an engine having a crank case and base and including inner and outer walls arranged in spaced relationship, longitudinal openings extending through said inner and outer walls, and arranged in coaxial alignment, a bearing cap closing each of said inner wall openings, a crank shaft journaled in said bearing caps and

extending through said outer wall openings, a fly wheel mounted in one of said outer wall openings, means closing the other of said outer wall openings, and an electric machine operatively connected to said crank shaft at the end opposite said fly wheel.

5. In a device of the character described, the combination with an engine having a crank case and base and including inner and outer walls arranged in spaced relationship, said outer walls being provided with a pair of oppositely disposed openings, a crank shaft extending through said openings, a fly wheel mounted on one end of said crank shaft and rotatably mounted in one of said openings, and an electric machine operatively connected to the opposite end of said crank shaft and normally closing the other of said openings.

6. In a device of the character described, the combination with an engine having a crank case and base and including inner and outer walls arranged in spaced relationship, longitudinal openings extending through said inner and outer walls, and arranged in coaxial alignment, a bearing cap closing each of said inner wall openings, a crank shaft journaled in said bearing caps, a fan mounted on said crank shaft and rotatably supported within an outer wall opening, a cylinder mounted on said inner walls, a hood surrounding said cylinder and mounted on said outer walls, said fan being adapted to draw air through said cylinder hood and between the inner and outer walls of the combined crank case and base, and electric machine mounted on the outer walls defining an opening opposite said fan opening, and means for circulating an air draft through said electric machine independent of said engine draft.

7. In a device of the character described, the combination with an engine having a crank case and base, and including inner and outer walls arranged in spaced relationship,

of a cylinder mounted on said inner walls, a cylinder hood mounted on said outer walls, an electric machine operatively connected with said engine, means for drawing an air draft through said cylinder hood and into contact with the engine crank case, and independent means for circulating an air draft through said electric machine.

8. In a device of the character described, the combination with an engine having a crank case and base, and including inner and outer walls arranged in spaced relationship, of a cylinder mounted on said inner walls, a cylinder hood mounted on said outer walls, an electric machine operatively connected with said engine, a combined fly wheel and fan for drawing an air draft through said cylinder hood and into contact with the engine crank case, independent means for circulating an air draft through said electric machine, and means for discharging each of said air drafts separately to the atmosphere.

9. In a device of the character described, the combination with an engine having a crank case and base and including inner and outer walls arranged in spaced relationship, said outer walls being provided with a pair of oppositely disposed openings, a crank shaft extending through said openings, a combined fly wheel and fan mounted on one end of said crank shaft and rotatably mounted in one of said openings, said fan being adapted to create an air draft between said inner and outer walls, an electric machine comprising an armature and a field frame operatively connected to the opposite end of said crank shaft and normally closing the other of said crank case openings, and means for circulating an air draft through said electric machine independent of said engine draft.

In testimony whereof, I hereunto affix my signature.

MERRITT A. VINING.