

March 31, 1936.

O. JANZEN

2,035,812

ELECTRIC HAND LAMP

Filed Dec. 12, 1934

*Fig. 1*

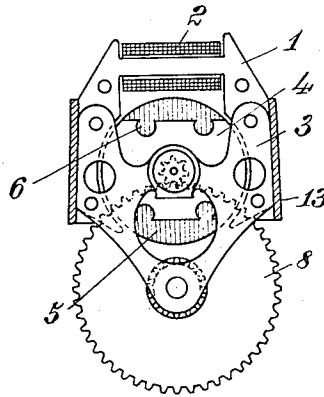


*Fig. 2*

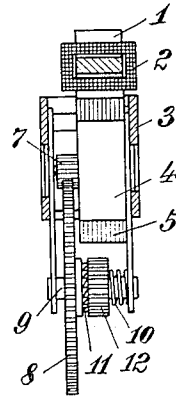


*Fig. 3*

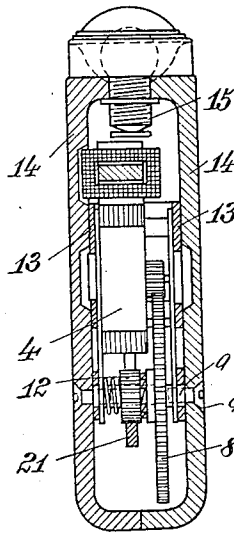
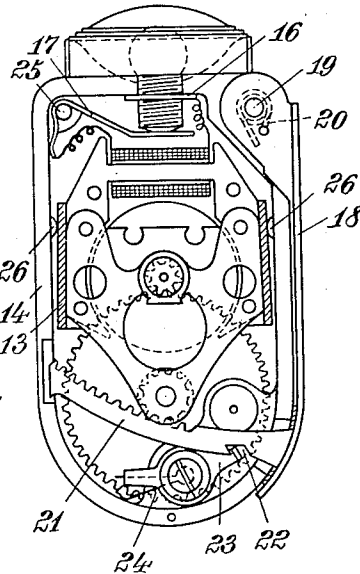


*Fig. 4*



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## UNITED STATES PATENT OFFICE

2,035,812

## ELECTRIC HAND LAMP

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Application December 12, 1934, Serial No. 757,205  
In Germany December 15, 1933

4 Claims. (Cl. 240-10.5)

The present invention relates to hand lamps, and more particularly to electric hand lamps of the type operated by means of a small dynamo.

It has already been proposed to provide hand lamps with a small dynamo operated by hand pressure, the movement resulting from the hand pressure being converted by means of a rack and toothed wheel into a movement of rotation of the dynamo. In such hand lamps, the rotor has had a very high speed of rotation, particularly when the rotor has formed the magnet, with the induced winding arranged on the stator. With these dynamos, which are generally four-pole machines, either a very frequent or a powerful pressure has had to be exerted on the operating lever in order to obtain the necessary wattage output, which has been found inconvenient in using the lamp for a long period at a time. Hand lamps have also been proposed wherein the various components of the internal mechanism have been pressed into the two halves of an outer casing made of insulating material, the two halves of the casing being provided with a screw-thread by means of which they are assembled together. In this case, however, there has been the disadvantage that any inaccuracies or defects caused in the internal mechanism during the assembling of the parts or subsequently, cannot be remedied. In dynamos used for hand lamps and driven by lever pressure, it has also already been proposed to retain the pressure lever in the position of rest by means of a locking device or the like.

The present invention has for its object to provide an improved construction of hand lamp operating by means of a small dynamo wherein the above disadvantages are overcome.

In a construction of hand lamp according to the invention, the lamp comprises a small two-pole dynamo which is formed as a unit independent of the lamp casing. According to a feature of the invention, the said dynamo unit is resiliently mounted in the lamp casing. Preferably, the unit is only connected to the casing by means of its driving shaft, so that it is pivoted about this shaft. By means of this construction, the transmission of the noise of the machine or of the driving mechanism to the exterior is reduced and any irregularities in manufacture, such as between the dynamo and casing, are also compensated for.

The dynamo may be set in rotation by means of a power lever operated by hand and preferably comprises a two-pole magnet as rotor, so as to obtain maximum steel masses for the pole pieces

which are required for electro-magnetic reasons, which pole pieces, as is well-known, each extend preferably over a quarter of the circumference of the rotor. This two-pole bar-shaped rotor is completed to form a circular mass by means of a heavy non-magnetic metal, whereby air resistances are avoided in the dynamo and the centrifugal mass of the rotor is substantially increased. In order to obtain a permanent connection between the magnetic and the non-magnetic parts of the rotor, the heavy metal mass is so affixed to the magnetic part, preferably by means of the spray casting process, that the bar-shaped magnet is embedded in the heavy metal without the latter forming a short-circuit. The construction of the dynamo as a two-pole machine with a rotating magnet armature also permits a relatively large amount of iron to be used for the stator in the small space available, so that even at low speed, a high wattage output can be obtained. The low speed in turn offers the advantage that only a few gear wheels are required for the transmission between the operating lever and the rotor of the dynamo, and these wheels may therefore be of powerful construction, whereby a comparatively small force is sufficient to drive the dynamo.

The invention will be more clearly understood from the particular embodiment thereof which is described hereafter, by way of example, with reference to the accompanying drawing, in which:

Figs. 1 and 2 represent, in a partial section in front and side views respectively, the dynamo as an independent unit.

Fig. 3 is a side elevation of a section through the casing, showing the dynamo inserted in the casing.

Fig. 4 is a front view of the dynamo inserted in the casing, with half of the casing removed.

The two-pole stator 1, preferably of laminated iron, carries on its yoke the induced winding 2 and on its faces the bearing bracket 3 for the rotor 4, which is formed as a two-pole magnet and is completed by a heavy non-magnetic metal part 5, to form a completely circular disc. This non-magnetic metal is sprayed round the magnetic bar in such a manner that it completely surrounds the latter on three sides, while leaving the pole pieces free, but penetrates on one of the flat sides into dovetail-like recesses 6 in the rotor 4, whereby a firm connection is obtained in the radial direction whilst avoiding a short-circuit. A gear wheel 7 is fixed on the shaft of

the rotor 4 and is driven by a further gear wheel 8, which consists preferably of pressed material and is mounted in the bearing bracket 3 on the stationary shaft 9. The gear wheel 8 under pressure of spring 10, is also connected through the coupling 11, acting only in one direction, to the driving wheel 12 which is loosely mounted on the same shaft 9. As shown in Fig. 1, the bearing bracket of the embodiment illustrated is provided on its outer faces with a flexible rubber lining 13 which preferably consists of a rubber tube of suitable length.

As shown in Figs. 3 and 4, the lamp casing comprises two halves 14 made from pressed insulating material, a bulb 15 being provided in the usual way, having means 16 and 17 for connection to the winding 2. The single-armed operating lever 18 is pivotally mounted on the axis 19 in one of the halves of the casing. The axis 19 automatically moves outwards under the action of the spring 20, and the lever 18 is provided at its end with an arcuate rack 21 which meshes with the driving wheel 12 of the dynamo. In the rack 21, is provided a recess 22 in which engages a pawl 23 which when pressure is exerted on the lever 18 in the position of rest, releases this lever under pressure of the spring 24, and is provided with a locking member (not shown) passing through the casing.

The connection of the dynamo to the casing is merely effected through the driving shaft 9 which may be constructed either directly as a connecting screw for the two halves of the casing or as a hollow shaft through which passes a connecting screw. Further connecting screws or the like for the casing may be provided, for instance, in the shaft 19 or at the point 25 at the upper end of the lamp. As shown in Fig. 3, the hollow shaft 9 may be threaded to engage the threads of a member such as 9' which extends through the casing. One such screw 9' may be provided on each side and these will serve to hold the two halves of the casing assembled with relation to the contained mechanism. Owing to the above construction, the dynamo is pivotally mounted on the axis 9 within the casing and is resiliently held therein by the rubber lining 13. Substantially circular recesses may be provided in the two halves of the casing at the bottom, into which recesses are pressed parts of the rubber lining during assembly, so as to prevent any swinging movement of the dynamo. This may also be assisted by projections 26 provided on the narrow sides of the casing. Any inequalities in the depth of the two halves of the casing or in the overall height of the dynamo are compensated by the resilient mounting of the latter in a manner which substantially simplifies the assemblage of the whole.

For operation of the handlamp, the lever 18, which is locked by hand in the position of rest by means of the pawl 23, is pressed slightly harder than usual against the casing 14, so as to unlock it under the action of spring 24, and the lever then springs outwards under the action of spring 20. By pressing the lever 18 down again against the casing, the rotor of the dynamo is set in movement by means of the rack 21 which is connected to the lever 18 and through the driving wheel 12, coupling 11 and gear wheels 8 and 7 to the rotor. The necessary wattage output is thus obtained to operate the lamp from the dynamo. When the pressure on the lever 18 ceases the lever is again moved out-

wards by the spring 20, the driving wheel 12 of the dynamo reversing; since, however, the coupling 11 is inactive in this direction, the further rotation of the rotor caused by centrifugal force is not reduced.

It will be understood that the invention is in no way limited to the particular embodiment described above by way of example, and that many modifications thereof may be made within the scope of the appended claims.

I claim:

1. In an electric hand lamp, the combination of a lamp casing, said casing having a removable portion, a hand-operated two-pole dynamo mounted therein and formed as a unit independent of said casing, said dynamo unit including a stator having an induced winding, a rotor comprising a two-pole bar magnet and a member of heavy non-magnetic material affixed thereto and forming with said magnet a substantially circular mass, and a driving shaft for said rotor, said driving shaft coacting with said casing to pivotally mount said dynamo unit therein and serving also as a means for holding the two portions of said casing together when assembled, and resilient means for positioning said dynamo unit in said casing.

2. In an electric hand lamp, the combination of a lamp casing, said casing having a removable portion, and a hand-operated two-pole dynamo mounted therein and formed as a unit independent of said casing, said dynamo unit including a stator having an induced winding and a rotor comprising a two-pole bar magnet and a member of heavy non-magnetic material affixed thereto and forming with said magnet a substantially circular mass, a bracket on said stator for carrying said rotor, and a driving shaft for said rotor, said driving shaft coacting with said casing to pivotally mount said dynamo unit therein and serving also as a means for holding the two portions of said casing together when assembled, and resilient means for positioning said dynamo unit in said casing, said means including a facing of resilient material on the outer faces of said bracket which coact with the internal walls of said casing.

3. In an electric hand lamp, the combination of a lamp casing, a hand-operated two-pole dynamo mounted therein and formed as a unit independent of said casing, said dynamo unit including a stator having an induced winding, a rotor comprising a two-pole bar magnet and a member of heavy non-magnetic material affixed thereto and forming with said magnet a substantially circular mass, and means for driving said rotor comprising a driving shaft, a first gear wheel mounted on said driving shaft, and a second gear wheel also mounted on said shaft and coupled to said first wheel by a coupling member operative only in one direction of rotation of said shaft, resilient means for positioning said dynamo unit in said casing, a spring controlled hand lever on said casing, and means including an arcuate rack coacting with said second gear wheel of said dynamo unit and operated by said hand lever, for converting the movement of said hand lever into a movement of rotation of said rotor of said dynamo unit.

4. In an electric hand lamp, the combination of a lamp casing, said casing having a removable portion, a hand-operated two-pole dynamo mounted therein and formed as a unit independent of said casing, said dynamo unit including a stator of laminated iron carrying an

induced winding and a rotor comprising a two-pole bar magnet and a member of heavy non-magnetic material affixed thereto and forming with said magnet a substantially circular mass, 5 a bracket on said stator for carrying said rotor, a facing of resilient material on the outer faces of said bracket which coact with the internal walls of said casing to position said dynamo unit therein, a driving shaft for said rotor, said driving shaft coacting with said casing to pivotally 10 mount said dynamo therein and serving also as a means for holding the two portions of said casing together when assembled, a first gear wheel mounted on said driving shaft, and a

second gear wheel also mounted on said shaft and coupled to said first wheel by a coupling member operative only in one direction of rotation of said shaft, a spring-controlled hand lever on said casing, means including an arcuate 5 rack coacting with said second gear wheel of said dynamo unit and operated by said hand lever, for converting the movement of said hand lever into a movement of rotation of said rotor of said dynamo unit, and a spring-controlled 10 stop member for locking said hand lever in the position of rest.

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