

No. 876,973.

PATENTED JAN. 21, 1908.

A. F. KNIGHT.  
MOTOR COOLING DEVICE.  
APPLICATION FILED AUG. 25, 1902.

Fig. 3.

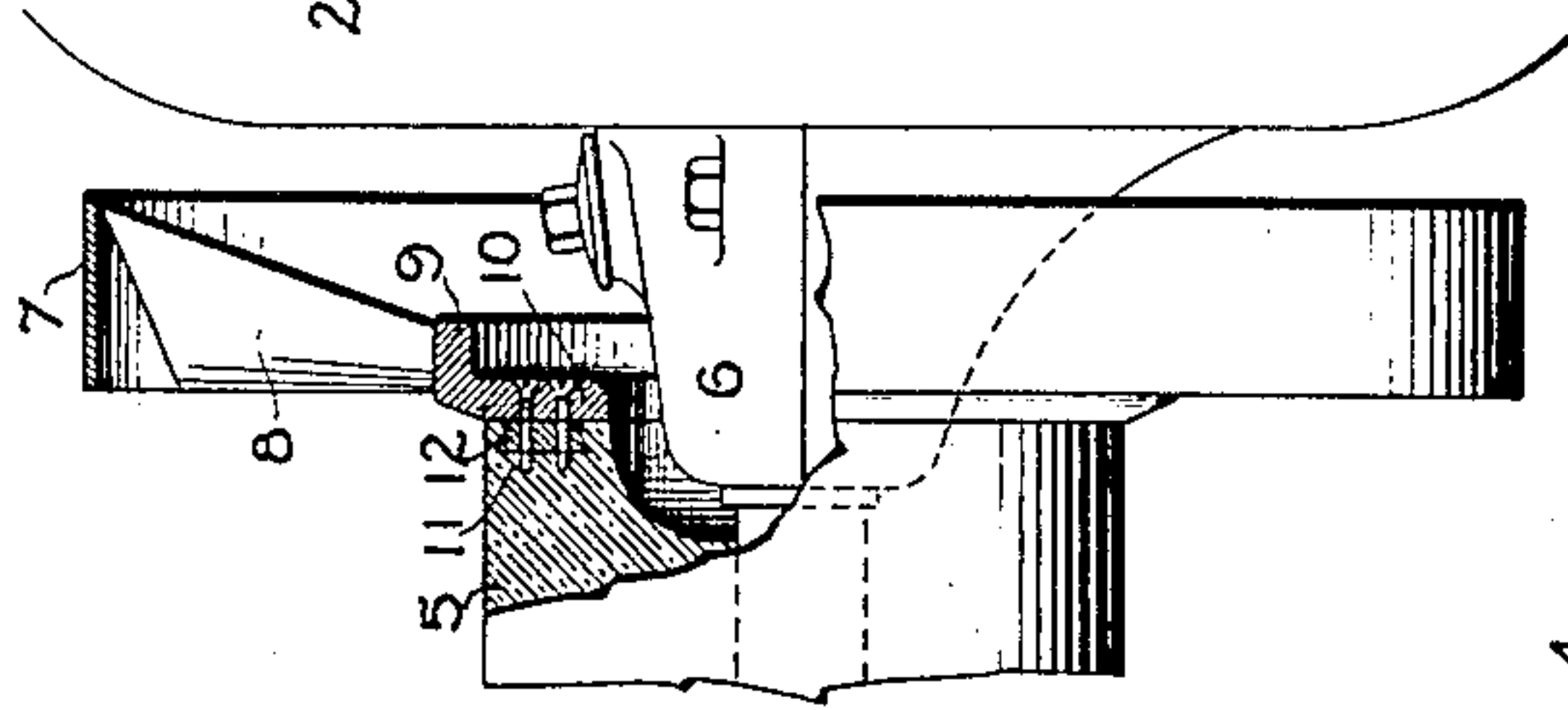


Fig. 2.

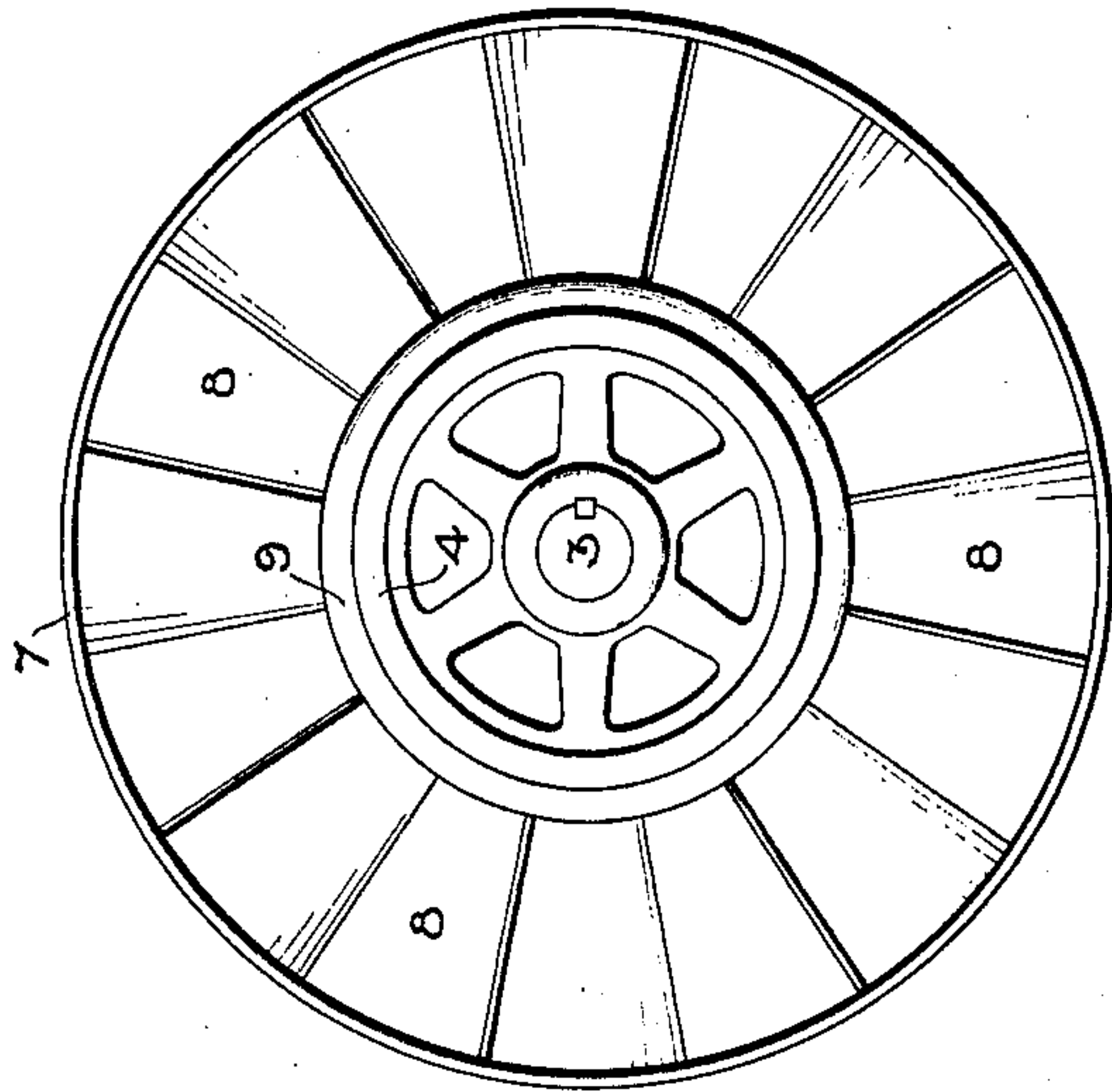


Fig. 4.

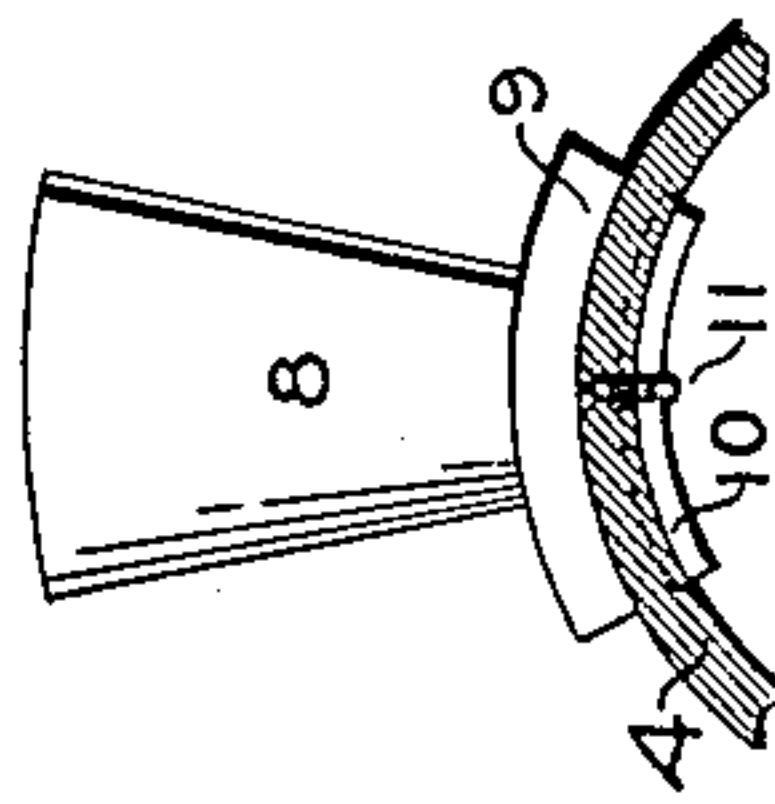
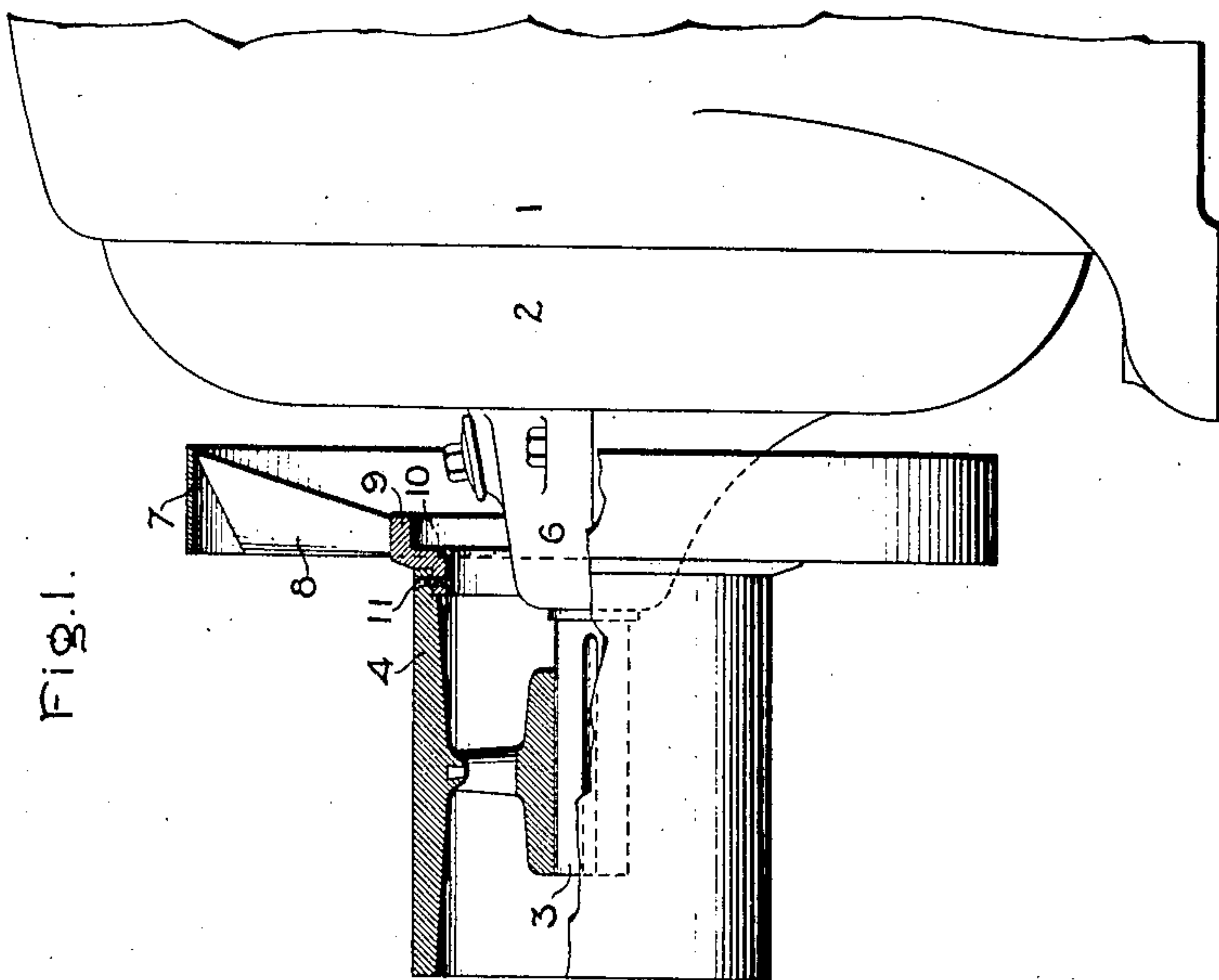


Fig. 1.



WITNESSES:

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Atty



# UNITED STATES PATENT OFFICE.

ARTHUR F. KNIGHT, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## MOTOR-COOLING DEVICE.

No. 876,973.

Specification of Letters Patent.

Patented Jan. 21, 1908.

Application filed August 25, 1902. Serial No. 120,872.

*To all whom it may concern:*

Be it known that I, ARTHUR F. KNIGHT, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Motor-Cooling Devices, of which the following is a specification.

This invention relates to dynamo-electric machines, and its especial object is to provide an improved means for cooling an electric motor. It is well known that if the temperature of a motor can be kept down, its efficiency can be very greatly increased. Many ways of accomplishing this have been proposed, and the results have been very satisfactory. It is found that an air current from a simple fan attached to the motor shaft, or located in the belt-pulley will carry off sufficient heat to keep the temperature of the motor twenty-five per cent. lower than it would be without the fan, and consequently the rating of the motor can be correspondingly increased.

In some cases, as for instance, when the belt-pulley overhangs the shaft bearing, it is inconvenient to attach the fan to the motor shaft, and I have therefore invented a fan which can be attached to one end of the pulley. The fan consists preferably of two concentric rings connected by radial fan-blades extending outwardly from the pulley, the inner ring having a flange fitting the end of the pulley and adapted to receive the screws which fasten it to the pulley. By a slight modification of the flange it may be used with pulleys having a thin or a thick rim. The former are usually made of metal and the latter of paper pulp or wood.

In the accompanying drawing, Figure 1 is a side elevation, partly in section, of one end of a motor having a thin-rimmed pulley equipped with my improved fan; Fig. 2 is an end view of the pulley and fan; Fig. 3 shows the fan applied to a thick-rimmed pulley; and Fig. 4 shows a modification.

The motor illustrated is of the inclosed type, having an imperforate casing 1 and head 2. On the projecting end of the shaft 3 is secured the belt-pulley, which may have a thin metal rim 4, as shown in Figs. 1, 2 and 4, or a thick paper or wooden rim 5, as shown in Fig. 3. In either case, the inner end of the pulley overhangs the bearing 6, for the sake of compactness, making it awkward to at-

tach a fan to the shaft between the pulley and the head 2. I therefore provide a fan composed of an outer guard ring 7, radial fan-blades 8, and an inner ring 9, the latter having a flange 10 fitting the end of the pulley and fastened thereto by screws 11. The flange may fit inside the pulley, as in Fig. 1, or against the end thereof, as in Fig. 3. In the former case the fastening screws lie radially of the pulley, while in the latter case they extend into it longitudinally. To afford a better hold for the screws in a solid pulley of paper or wood, a ring 12 of metal may be let into the end of the pulley, being preferably embedded in the pulp when the paper pulley is molded. The outer ring may be omitted if desired, but I prefer to use it to protect the ends of the blades. If no guard ring is used, the ring 9 may be in sections of greater or less length, each section carrying a blade, as shown in Fig. 4.

When the motor is running, the fan causes a constant current of air against the head 2 and over the casing 1, which rapidly carries off the heat radiated from said parts.

Although I have illustrated my improved fan as applied to an inclosed motor, yet, in the case of motors operated in situations and under conditions which do not necessitate the use of a tight inclosing casing, my improved fan may of course be used to equal advantage for forcing the cooling air directly past the armature and the field coils of the motors; and I therefore do not desire the appended claims to be limited to any one type of motor except where the type is particularly specified.

What I claim as new and desire to secure by Letters Patent of the United States, is—

1. The combination with an electric motor provided with a belt-pulley, of a fan attached to the end of said pulley and extending outwardly therefrom.

2. The combination with an electric motor provided with a belt-pulley whose inner end overhangs the shaft bearing, of a fan attached to said inner end of said pulley and extending outwardly therefrom.

3. The combination with the belt-pulley of an electric motor, of a ring having a flange adapted to be fastened to one end of said pulley, and fan-blades radiating from said ring.

4. The combination with the belt-pulley of an electric motor, of an inner ring having

a flange adapted to be fastened to one end of said pulley, fan-blades radiating from said ring, and an outer guard-ring surrounding said fan-blades.

- 5 5. The combination with a solid pulley having a metal ring embedded in one end, of a fan fastened to said ring and extending outwardly therefrom.

In witness whereof, I have hereunto set my hand this twenty-second day of August, 10 1902.

ARTHUR F. KNIGHT.

Witnesses:

BENJAMIN B. HULL,  
ALMA L. MEUSCHKE.