

Patent Log- A Speed Measuring Device

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SUMMARY

Speed logs were used in the ancient era to record the speed and distance covered by a ship. They are mechanical devices that are mechanically dragged in the ocean to measure the vessel's distance and speed. To navigate at sea, many sorts of speed logs are employed. One of the most precise ways to gauge the ship's speed and distance covered is the patent log. It is a tiny, propeller-like instrument that measures the speed corresponding to the rotation of the rotating fins. Hence this paper has aimed at presenting the working of patent logs and its importance in navigation of the ship.

INTRODUCTION

In ships, an instrument called ship log or maritime log is used for measuring the speed and distance of the ship. It is also called as the speedometer of a vessel. They record the distance covered by the ship, while the speed was calculated by measuring the time difference between the successive readings of log and dividing the distance covered by the ship. There are different types of speed logs used in navigation of the ships. One among them is the Patent log. Patent log is an instrument that is used to measure the speed and distance travelled by a ship in water. It has a rotor with blades that rotates as the ship moves in the sea. The rotation of the blades is transmitted through a series of gear, which displays the speed and distance travelled in the register.



Figure 1. Patent log

History of Patent log

In 16th century, sailors used simple device called chip log to measure the speed of a ship. It has a wooden board with a rope attached to it and thrown overboard and it has knots at regular intervals, by counting the number of knots that passed through the sailor's hand, the ship's speed is measured. In the late 18th century patent logs were invented. Unlike the chip log. These were mounted on the ship's hull and contains rotor with cups which upon moving through water, cups get rotated and rotations are recorded on a dial. This was accurate than the chip log in measuring the ship's speed and distance. Over time, patent log was improved upon with new designs incorporating features like self-recording dials and mechanical registers.

Description

The patent log, also known as a taffrail log or screw log. This device was invented in 1688 by the English instrument maker Humphry Cole. The piece with the rotating fins is dragged behind the ship, while the gauge read the rotations of the fins to ascertain speed. The log is the marine equivalent of a speedometer.

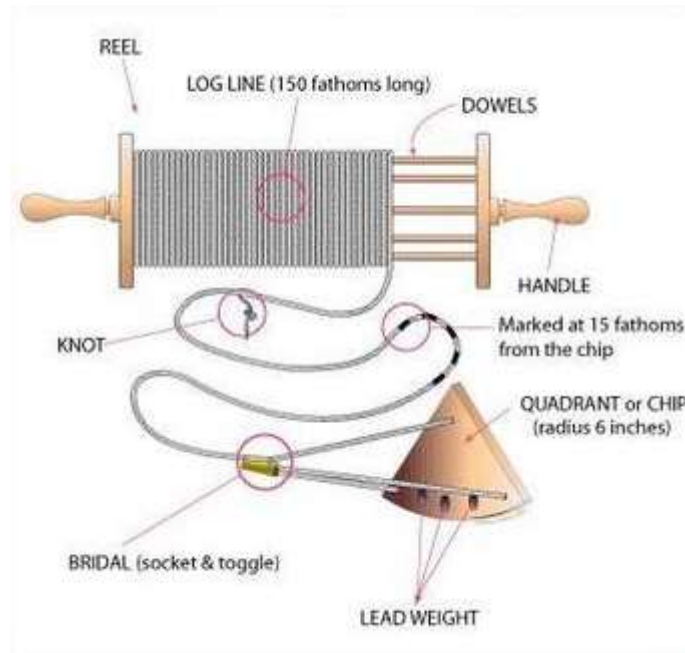
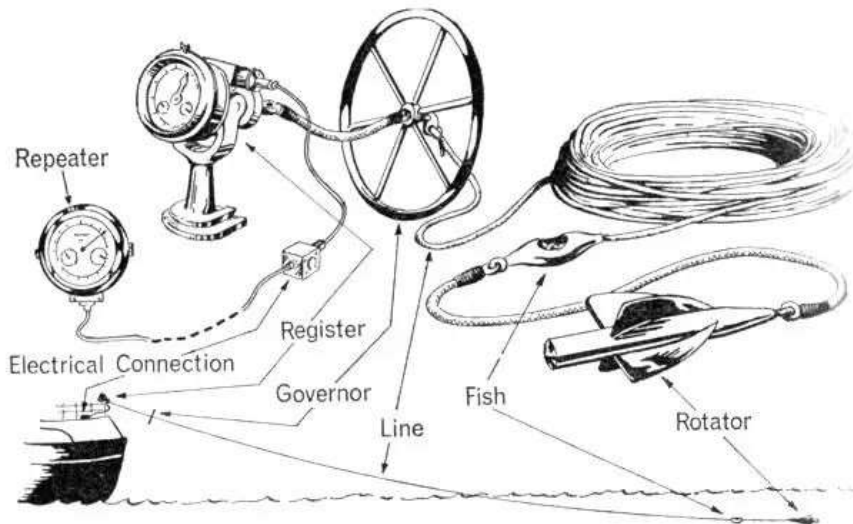


Figure 2. Chip log

Working of a Patent log

This log tows a streamlined gunmetal rotator having four pitched fins by means of a logline having a wire heart. The rotator revolves at a speed proportional to the speed of the ship through the water and induces a constant twist into the line. The faster the ship travels, the faster the rotor spins, and more revolutions are recorded on the dial. The ship's movement on the water turned the propeller and its revolutions were carried to a mechanical device called the "log register" and recorded, revealing the distance covered at any given time. The "Governor" was used to keep the rotation of the log line uniform and kink free. Sometimes the register electrically turned a repeater usually mounted on the bridge. The line is connected to the register, which dissipates the twist and converts the number of rotations into nautical miles, indicated on the dial of the register as well as the speed on a remote gauge.



Towed Log (Trident Type)

Figure 3. Parts of a patent log towed in ship

How to Use a Patent Log

To use a patent log for navigation, we need to deploy the instrument over the side of the ship. Once it is in water, it begins to spin, and rope attached to it will unwind from the reel. The distance travelled can be calculated by multiplying the speed by time elapsed. It is important to note the accuracy of the patent log can be affected by factors such as water temperature, salinity and currents. Therefore, it is essential to calibrate the instrument regularly to ensure accurate readings.

Purpose of Patent Log

It provides accurate information about a ship's speed and distance travelled. This helps the navigator in calculating the ship's position and course. Patent logs are still used today, but electronic versions has replaced older mechanical ones

Common errors in using a patent log

The usual causes of error are either 'the rotator is damaged, the line is of incorrect length, or that the rotator is towed in the slipstream of the propeller. Taking in the log line at the end of the voyage requires good seamanship. The line had to be disconnected from the register and then released back in the water so that it could unwind itself.

Types of Patent Logs:

There are several types of patent logs, each with its own unique features and benefits.

- Mechanical log
- Electronic log

The most common type is the traditional mechanical log, which uses a rotor to measure the speed of the ship through the water while electronic logs use sensors to achieve the same result.

Mechanical Logs

Mechanical logs are more traditional and have been used for centuries, while electronic logs are a newer technology that has become increasingly popular in recent years.

Advantages

- It is simple and reliable
- Do not require any external power source
- Ideal for smaller vessels or those operating in remote areas

Disadvantages

Less accurate than electronic logs, especially in rough seas or adverse weather conditions.

Electronic logs

In the electronic log, which also protrudes through the bottom of the ship, a water-driven rotor turns a small electric generator, the current from which is proportional to the speed of the ship. This current is similarly used to produce a speed measurement.



Figure 4. Electronic logs

Advantages

- Highly accurate and provide real-time data on speed and distance.
- Have additional features such as GPS integration and automatic logging,
- Save time and effort for navigators.

Disadvantages

- Requires a power source
- More complex to operate and maintain.

Modern Equipment for Distance and Speed Measurement

In recent years, the ship's speed and distance log device is used to measure the speed and the distance travelled by a ship from a set point. But in these days most ships use GPS to measure the speed of the ship. GPS system consists of a transmitter, receiver and satellite system. This is the most accurate method of measuring the speed of the vessel.



Figure 5. Speed and distance log device

CONCLUSION

Patent logs have played a crucial role in navigation for centuries. From their origins as simple mechanical devices to today's sophisticated electronic versions, patent logs have helped sailors and navigators measure speed and distance travelled with greater accuracy. By understanding how patent logs work and the different types available, we can better appreciate their importance in ensuring safe and efficient navigation.

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