Tape Laying Tool For Curved Tape Sections

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Tape Laying Tool For Curved Tape Sections

ABSTRACT

An arc taper tool is described herein that enables a user to easily lay curved sections of tape on a surface. The arc taper includes a swivel rod, a moveable holder to which is attached a pin that can be placed on the floor, and a tape holder that can hold a roll of tape. The tape holder is designed to accommodate tape rolls of various sizes and can be moved along the rod to adjust the arc radius. A wheel is attached to the tape holder to apply pressure to the tape after it has been laid on the floor for better adhesion. An arc taper guide that includes edges that can be aligned to respective sections of tape can optionally be utilized to lay a curved section of tape. The arc taper pin is positioned at a location marked by a hole in the arc taper guide and rotated about the location to lay a curved section of tape.

KEYWORDS

- Autonomous robot
- Autonomous guided vehicle (AGV)
- Robot navigation
- Self-driving
- Marking tape
- Guide tape
- Line marking

BACKGROUND

Autonomous guided vehicles (AGV) or robots that are utilized in facilities such as warehouses, data centers, distribution centers, etc. navigate the floor surface by following colored tape lines on the floor using a special sensor (e.g., optical) onboard the vehicle that can
sense the tape to determine a direction of movement. The tape lines are laid prior to AGV use based on navigable paths and routes that can be straight or curved, e.g., around corners and at intersections. Curved lines at intersections and corners enable the AGV to turn smoothly without stopping, which is more efficient and faster than turning abruptly, e.g., at right angles at a corner. Straight tape lines are laid by utilizing tape laying tools that are laser beam assisted. However, laying a curved section of tape that joins two intersecting lines can pose a challenge since it is difficult to quickly and precisely lay the tape down on the floor.

DESCRIPTION

This disclosure describes tools and techniques for laying arcs on a floor with tape. An arc taper tool is described herein for laying precise and curved sections of tape. An arc taper guide which can be utilized in conjunction with the arc taper tool is also described.

Fig. 1: Arc taper and arc taper guide

Fig. 1 depicts an example arc taper (arc tape laying tool) and an arc taper guide. The arc taper includes a swivel rod. Towards one end of the swivel rod is a moveable handle to which is attached a pin (e.g., silicone capped pin) that can be placed on the floor. Towards the opposite
end is a tape holder that can hold a roll of tape. The tape holder is designed to accommodate tape rolls of various sizes, e.g. a 3/4" tape roll, intended to be laid on the floor. The tape holder can be moved along the rod to adjust a radius of an arc of laid tape to the desired radius. A wheel, e.g., a neoprene rubber wheel is attached to the tape holder and enables easy movement of the arc taper and additionally applies pressure to the tape after it has been laid on the floor for better adhesion. A cutting surface, e.g. blade is integrated into the tape holder of the arc taper to enable a user to cut and end of the tape after the curved section has been laid on the floor.

Fig. 2: (a) Arc Taper use; (a) without using a taper guide (b) using a taper guide

Fig. 2 depicts an example curved section of tape being laid, per techniques of this disclosure. Fig. 2(a) depicts the tape being laid using the arc taper alone (without the arc taper guide). As depicted, straight (perpendicular) lines of tape are laid first, e.g., assisted by a laser guided tool.

A user places the arc taper at a center point of an intended arc that connects the perpendicular lines. A first step is to locate the center of the arc and set the pin (point) of the tool on that point, and then rotate the tool about that point to lay the tape. A rubber wheel presses on the tape, as it moves, to improve adhesion of the tape to the floor surface. The radius of the arc can be adjusted by moving the tape holder to a suitable position along a length of the rod. As
described earlier, the arc taper includes a cutting tool to cut an end of the tape after it has been laid on the floor.

Fig. 2(b) depicts the tape being laid by utilizing an arc taper along with an arc taper guide. The arc taper guide includes edges that can be aligned to respective (straight and perpendicular) sections of tape. The arc taper pin is positioned at a location marked by a hole in the arc taper guide. Rotation of the tool about the marked location is utilized to lay a curved tape section that connects the straight tape sections.

CONCLUSION

An arc taper tool is described herein that enables a user to easily lay curved sections of tape on a surface. The arc taper includes a swivel rod, a moveable holder to which is attached a pin that can be placed on the floor, and a tape holder that can hold a roll of tape. The tape holder is designed to accommodate tape rolls of various sizes and can be moved along the rod to adjust the arc radius. A wheel is attached to the tape holder to apply pressure to the tape after it has been laid on the floor for better adhesion. An arc taper guide that includes edges that can be aligned to respective sections of tape can optionally be utilized to lay a curved section of tape. The arc taper pin is positioned at a location marked by a hole in the arc taper guide and rotated about the location to lay a curved section of tape.