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PLATE GLASS SIZING ROLL

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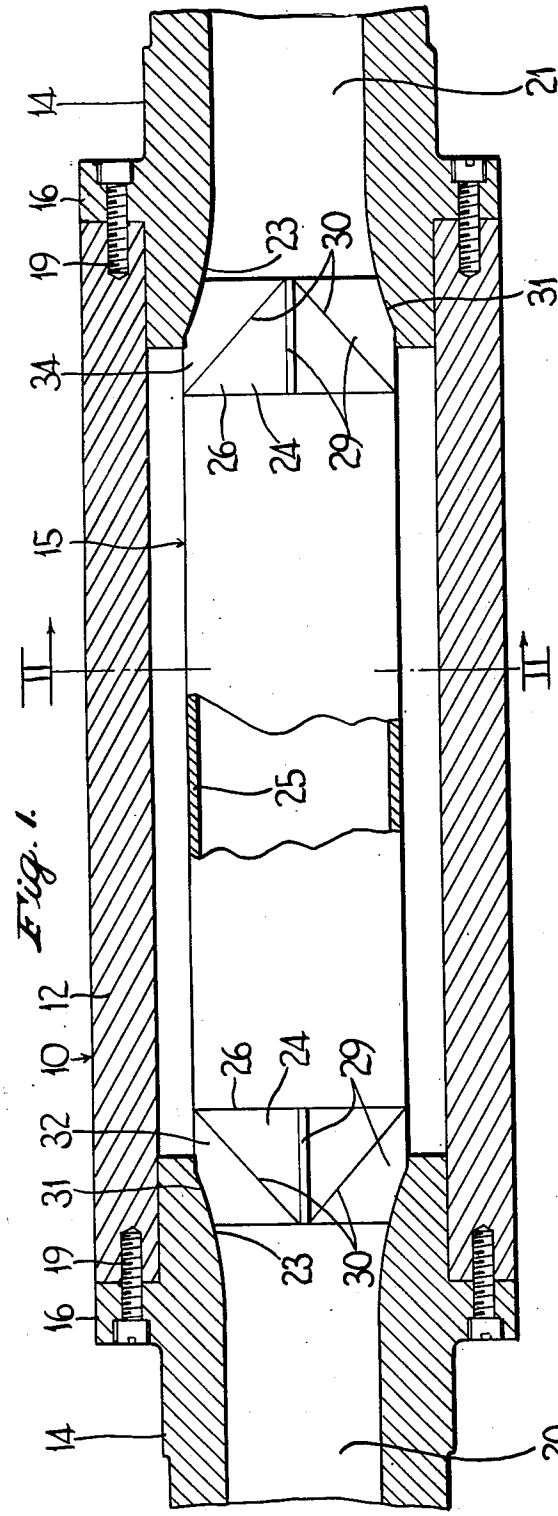

Fig. 1.

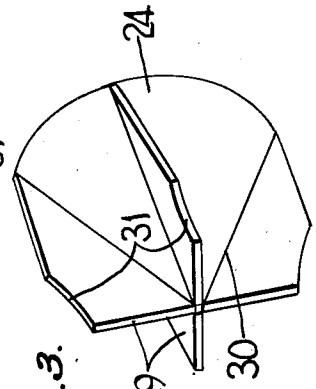

Fig. 3.

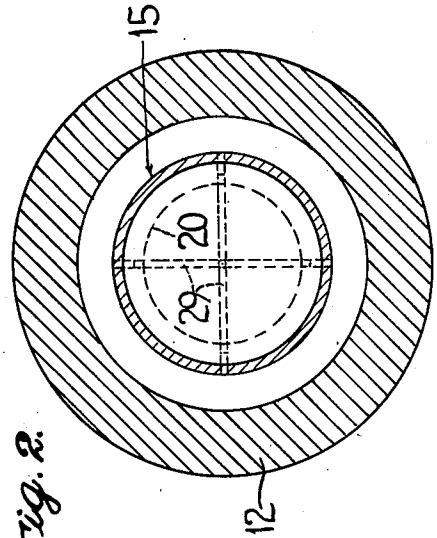

Fig. 2.

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PLATE GLASS SIZING ROLL

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2 Claims. (Cl. 257—95)

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This invention relates to fluid cooled sizing rolls for flattening molten glass and it has particular relation to the structural features of individual rolls of this type.

One object of the invention is to provide an improved roll structure suitable for rolling out molten glass preparatory to subjecting it to action of grinding and polishing surfacers.

Another object of the invention is to provide an improved sizing roll features of which involve the circulation of cooling fluid therethrough.

Sizing rolls of the type under consideration here are used in pairs at the outlet end of a glass melting tank for the purpose of sizing or flattening molten glass into sheet form as it passes between rolls of each pair. Examples of tanks and sizing rolls to which the invention is applicable are shown generally in U. S. Patent 1,532,134 issued to F. Gelstharp on April 27, 1925.

As a result of the heat contained in the molten glass it is necessary to maintain the cooling fluid circulating through the rolls to prevent them from warping and to prevent other disadvantages that tend to result from excessive heat.

According to this invention the roll is so constructed that a fluid cooling medium is maintained closely adjacent the surface of the roll without involving the movement of a central body of the fluid which would otherwise have little or ineffective cooling action along the roll surface where it is required. Water is circulated through the rolls at considerable speed, for example, at 5 feet per second and a great proportion of the water is in contact with the inner surface of the roll. In this manner, a relatively small amount of water cools a greater area than that cooled by conventional systems.

In the drawing:

Fig. 1 is a fragmentary longitudinal section of a sizing roll; Fig. 2 is a cross-section in a vertical plane taken substantially along the line II—II of Fig. 1; and Fig. 3 is a perspective of a cap for a sizing roll core.

In one form of the invention, a sizing roll 10 includes a central shell section 12 of cylindrical or tubular character which is partially telescoped with end bearing sections 14, and a core 15 is disposed inside the shell section in spaced relation to the inner walls thereof. The end bearing sections 14 extend into opposite end portions of the shell section 12 in closely fitting relation and are formed with radial flanges 16 whose circumferential surfaces are flush with the circumferential surfaces of the cylindrical section 12. Suitable fastening elements 19 extend through the flanges 16 and are screw-threaded into the end portions of the central section to secure all of these sections in closely fitting fluid-tight relation. Inlet and outlet passages 20 and 21 of the sections are formed with inwardly flaring inner walls 23 substantially conical in contour.

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The core 15 is hollow or shell-like and is formed by securing conical end caps 24 upon opposite ends of a cylindrical tube 25. All of the elements of the sizing roll are composed of suitable metal, such as steel, and the conical caps are welded in fluid-tight relation to the ends of the tube 25 along circumferential lines or seams 26.

These caps are also formed with fins 29 in a spider construction and the fins define planes disposed substantially at right angles to each other. The longitudinal axis of the sizing roll 10 is coincidental with the common axis of the central section 12, end sections 14, and hollow core 15. This axis lies substantially in the intersection of the planes defined by fins 29. The latter are in the form of metal plates which are welded along lines or seams 30 to the outer surfaces of the conical caps 24. The outer corner portions of the fins have bevelled or wedging surfaces 31 which fit in wedging relation against inner conical surfaces 23 that define the inlet and outlet passages 20 and 21. These elements of the sizing roll are so proportioned that the final tightening of the fastening elements 19 causes the surfaces 23 and 31 to wedge snugly against one another so as to hold the core section 15 tightly inside the cylindrical shell 12 in coaxial relation therewith.

From this description it will be apparent that the fins 29 define openings 32 leading from the inlet passage 20 for directing cooling fluid around the outside of the core 15, and through similar openings 34 leading into the outlet passage 21. Thus a relatively thin annular body of water passes closely against the inner surfaces of the shell section 12 and provides extremely efficient cooling thereof. It is to be noted that the length of the shell 12 provides the effective area over which glass is adapted to be passed in forming it into sheets.

Although illustrative forms of the invention have been shown and described in detail, it will be apparent to those skilled in the art that the invention is not specifically limited to such forms, but that various changes can be made therein without departing from the spirit of the invention or from the scope of the appended claims.

I claim:

1. A hollow sizing roll comprising a central cylindrical section, a tubular member inside the central section defining therewith an annular space, conical caps mounted on opposite ends of said tubular member, hollow bearing sections bolted to opposite ends of the central cylindrical section and having inlet and outlet openings communicating with said annular space, said bearing sections having inner conical walls spaced respectively in substantially parallel relation from the outer walls of the conical caps, a spider structure extending radially from the caps as rigid parts thereof and defining passages for the communication between the bearing sections and the central section, said spider structure having outer extremities sloped according to the slope of said conical walls, and means connecting the bearing sections in fluid tight relation to the ends of the central section and holding said conical walls in wedging relation with the sloped extremities of the spider structure.

2. In a sizing roll for flattening molten glass, a cylindrical shell section, a watertight hollow core inside the cylindrical shell section arranged substantially axially thereof and spaced from the inner wall of said section, fins extending radially with respect to the axis of the core and outwardly from opposite end portions of the core, radial extremities of said fins having beveled edges, inlet and outlet sections connected in watertight relation to the opposite ends of the shell section and having inner conical walls engaging in wedging relation the beveled edges of said fins to maintain the core in rigid relation in said shell section, and means for securing the inlet and outlet sections to the end portions of the cylindrical shell section, said inlet and outlet hollow sections being arranged substantially axially of the shell section, said fins and hollow core defining passages communicating from the inlet and outlet sections to the interior of the shell section.

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