

[54] **ELECTRONIC INFUSION DEVICE AND NOVEL ROLLER CLAMP HOLDEN THEREFOR**

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[51] Int. Cl.<sup>6</sup> ..... **F04B 49/00; F04B 43/09**

[52] U.S. Cl. .... **417/63; 417/474; 604/250**

[58] Field of Search ..... **417/474, 63, 360; 604/34, 153, 250**

[56] **References Cited**

**U.S. PATENT DOCUMENTS**

4,155,362	5/1979	Jess	128/214 F
4,460,358	7/1984	Somerville et al.	604/250
4,586,691	5/1986	Kozlow	251/7
4,689,043	8/1987	Bisha	604/250
4,818,190	4/1989	Pelmulder	417/360
4,857,050	8/1989	Lentz et al.	604/67
4,878,896	11/1989	Garrison et al.	604/65
5,017,192	5/1991	Dodge et al.	604/250
5,039,279	8/1991	Natwick et al.	417/474

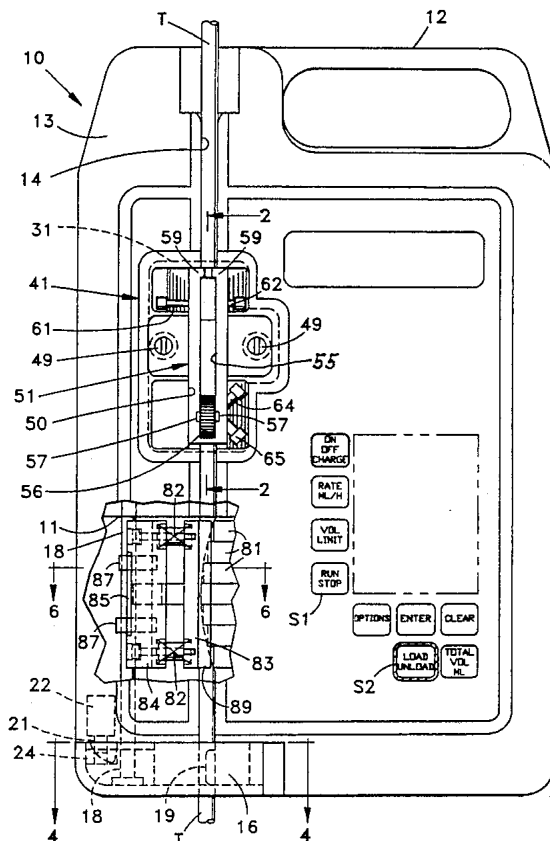
5,116,203	5/1992	Natwick et al.	417/474
5,219,327	6/1993	Okada	604/250
5,300,044	4/1994	Classey et al.	604/250
5,437,625	8/1995	Fields et al.	604/250
5,437,642	8/1995	Thill et al.	604/250
5,482,446	1/1996	Williamson et al.	417/474

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[57] **ABSTRACT**

A holder for an IV tube roller clamp is removably secured in the housing of an electronic infusion device, and has in opposite ends thereof a pair of photo-electric devices, one of which detects when the roller of the clamp is in its tube opening position, and the other detects when the roller is in tube closing position. A lever is pivotal on the housing between a closed position in which it operatively connects the IV tube to a pump unit in the housing, and an open position in which it permits removal of the IV tube from the unit. The spring-loaded armature of a solenoid prevents the lever from being opened until the solenoid coil is energized, and the photo-electric devices prevent the solenoid coil from being energized until the roller is in its tube closing position. When closed, the lever overlies part of the tube channel in which the IV tube is seated and also shifts a pressure plate in the pump unit to a position in which a lip thereon overlies another portion of said channel.

**20 Claims, 4 Drawing Sheets**



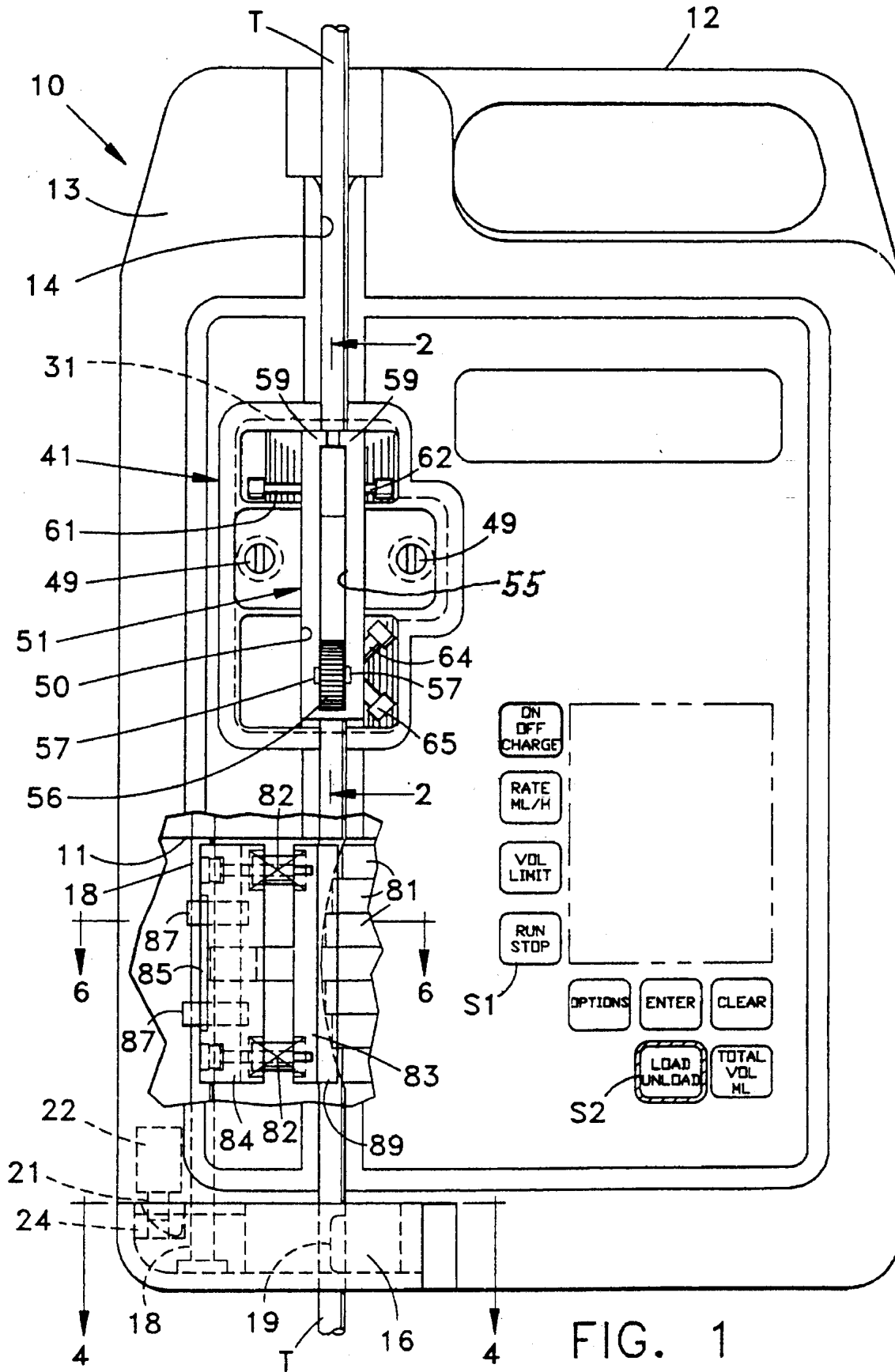


FIG. 1

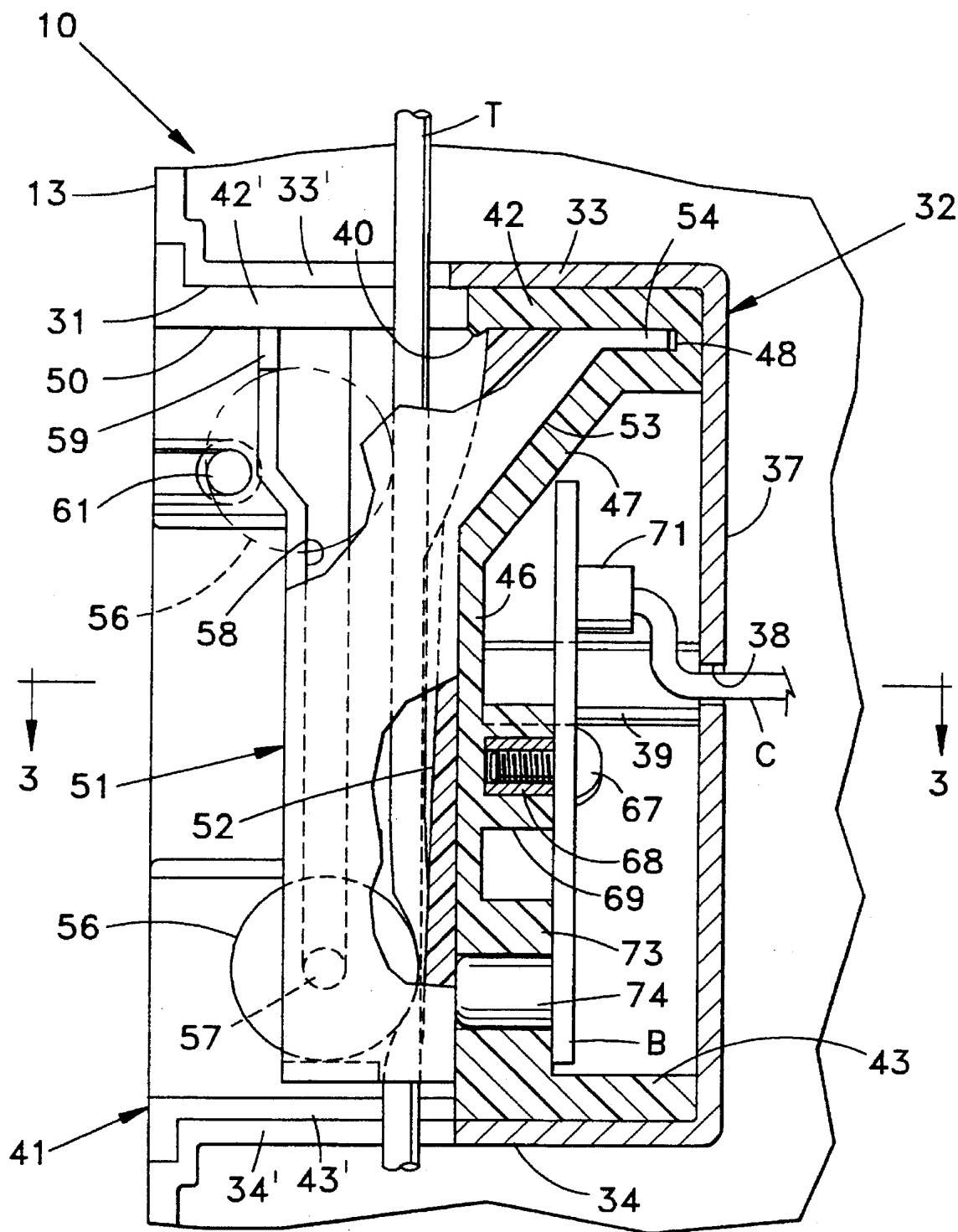


FIG. 2

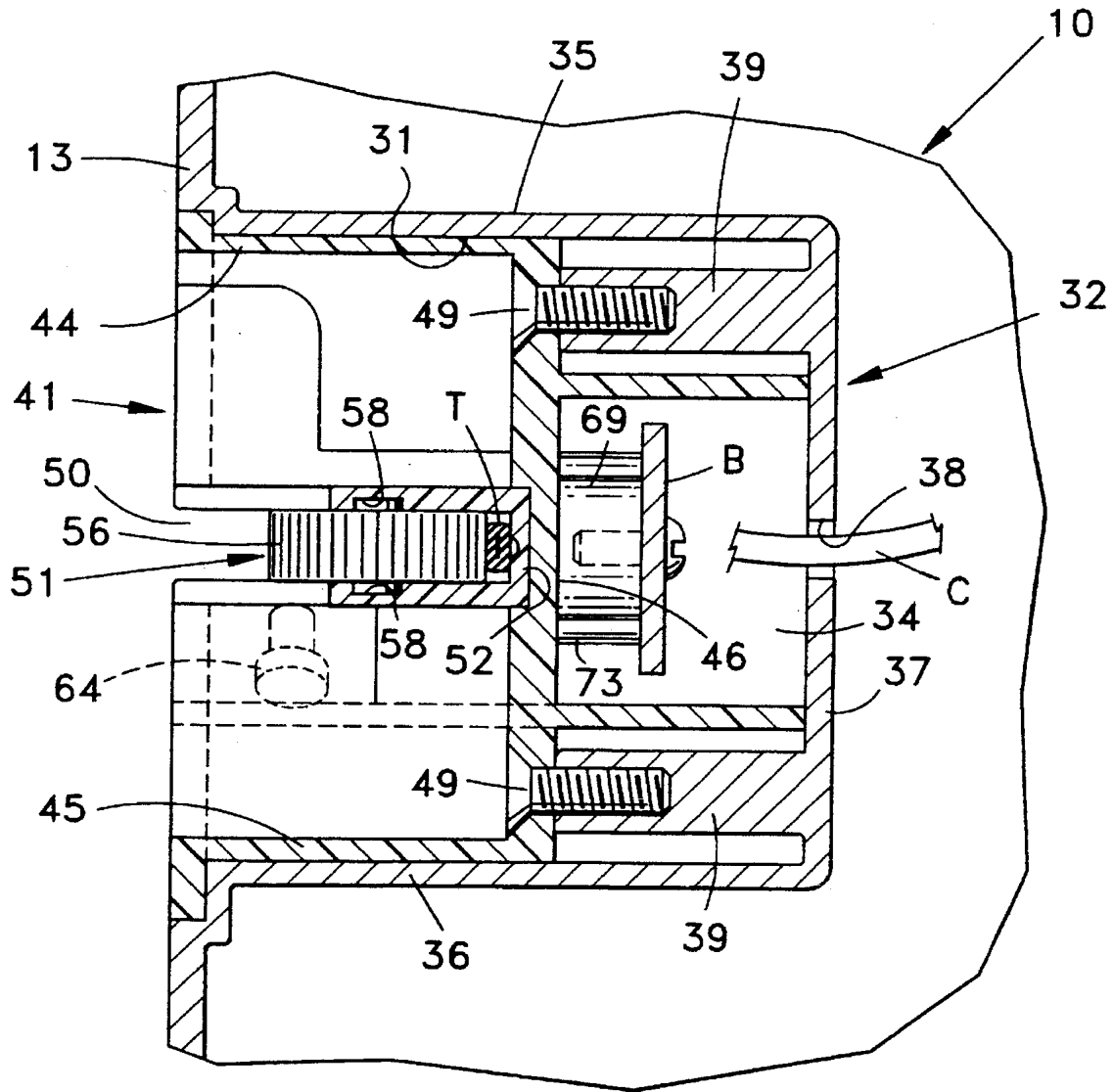


FIG. 3

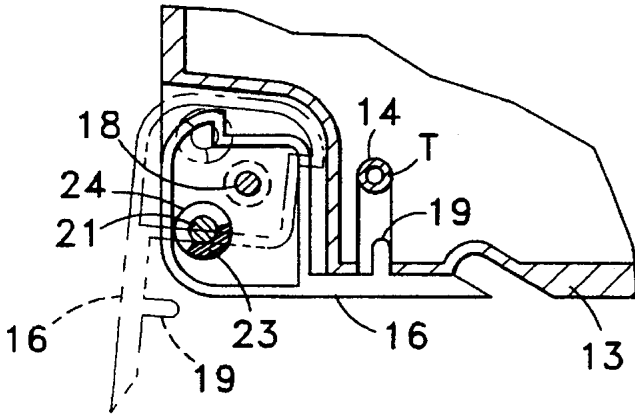


FIG. 4

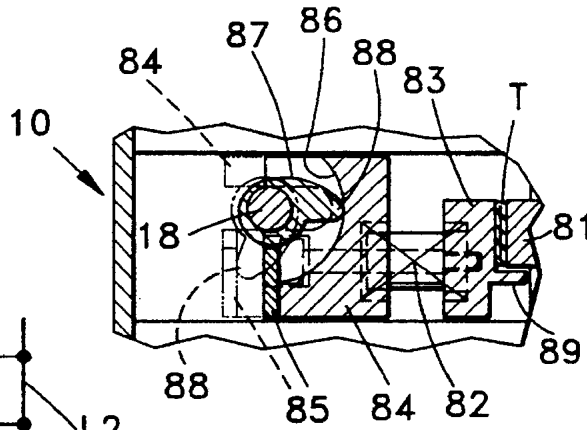


FIG. 6

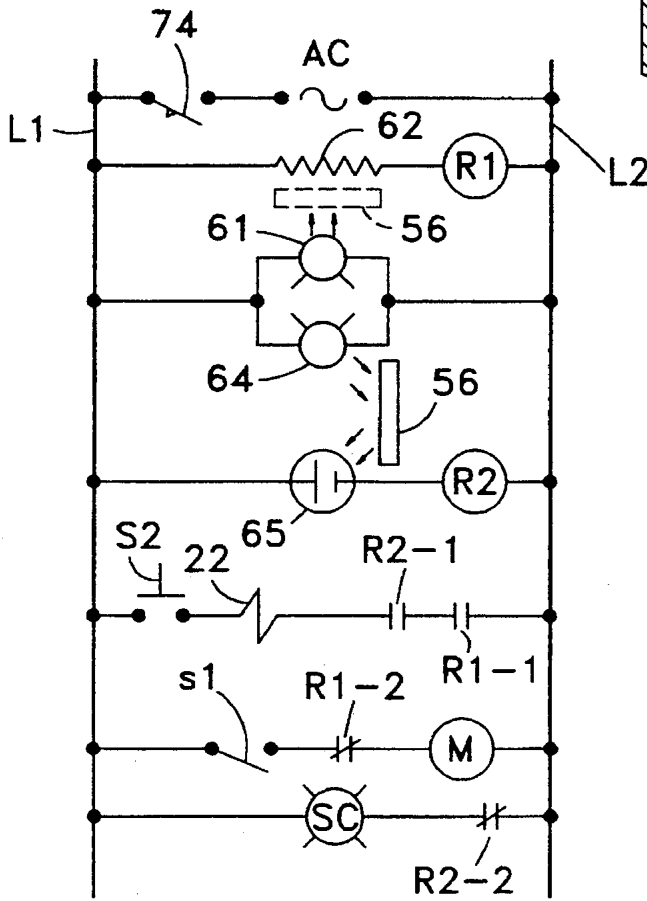


FIG. 5

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