

[54] COUPLING PIN FOR SUCKER ROD MADE OF FIBER-REINFORCED PLASTIC MATERIAL

4,653,953 3/1987 Anderson et al. 403/268
4,662,774 5/1987 Morrow, Jr. 403/266

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[57] ABSTRACT

[21] Appl. No.: 62,765

A sucker rod coupling pin comprises a hole into which the sucker rod is to be inserted, and has a plurality of annular depressions which surround the inner wall of the hole. As viewed crosswise, the annular depressions respectively have tapered surface portions arranged in series from the open end to the closed end of the coupling pin hole. The tapered surface portions whose cross sections progressively increase toward the closed end of the coupling pin hole have their respective lengths progressively shortened in relation to the preceding tapered portion, toward the closed end of the coupling pin hole, and the angle of inclination of the respective tapered surface portions progressively increases toward the closed end of the coupling pin hole.

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[30] Foreign Application Priority Data

Jul. 4, 1986 [JP] Japan 61-156215

[51] Int. Cl.⁴ F16B 11/00

[52] U.S. Cl. 403/268; 403/334

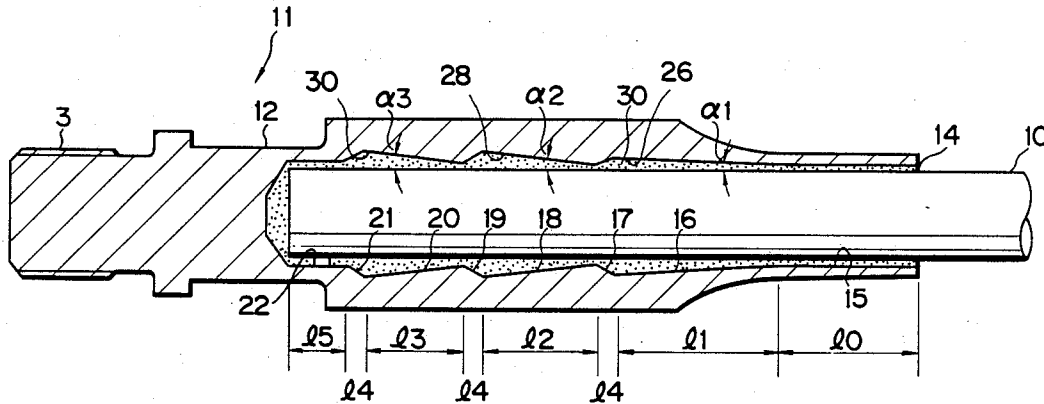
[58] Field of Search 403/266, 267, 268, 334

[56] References Cited

U.S. PATENT DOCUMENTS

4,475,839 10/1984 Strandberg 403/268 X

14 Claims, 4 Drawing Sheets



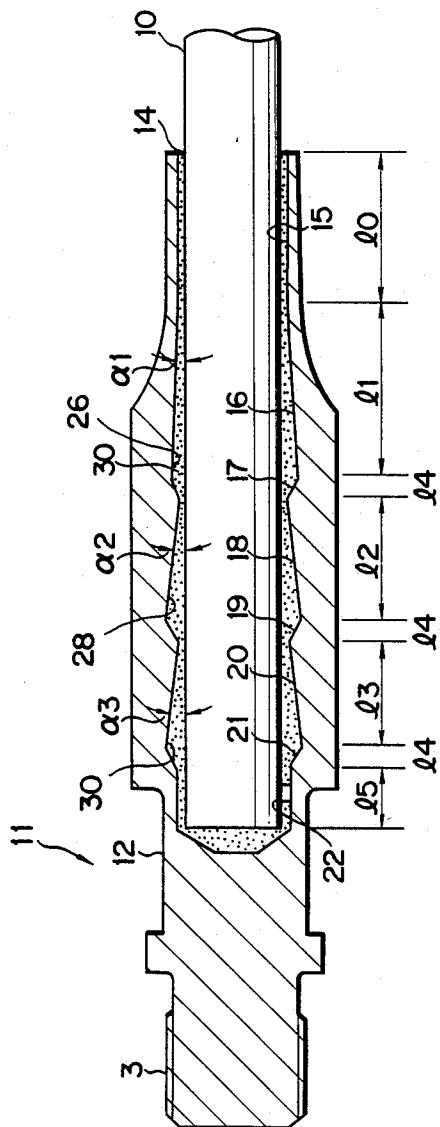
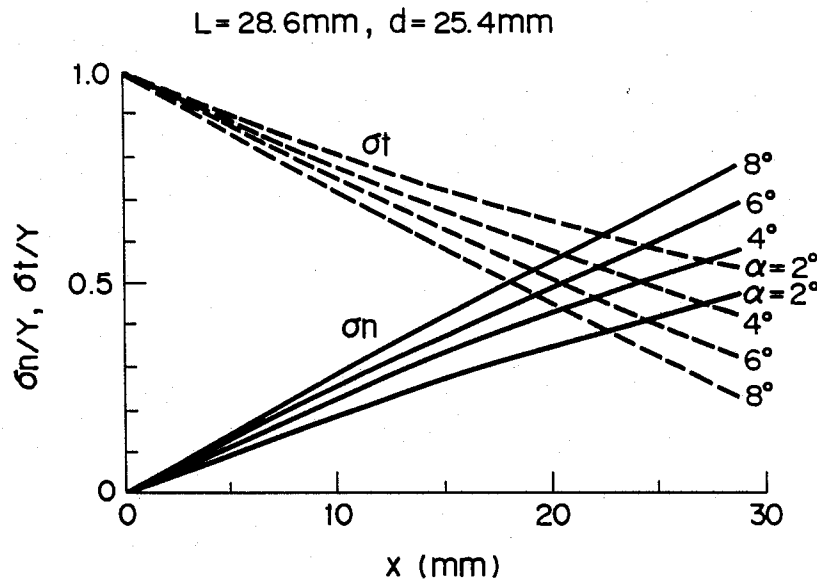
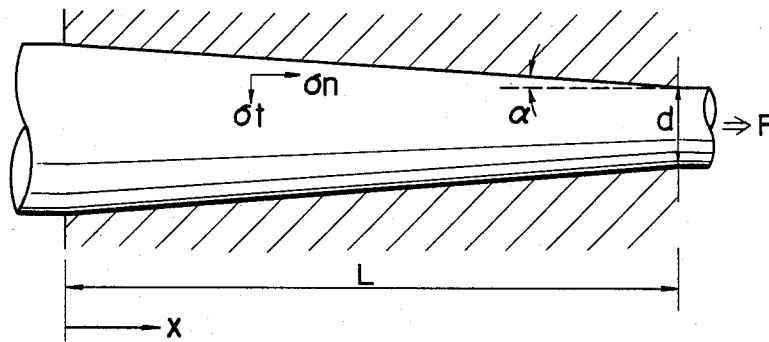


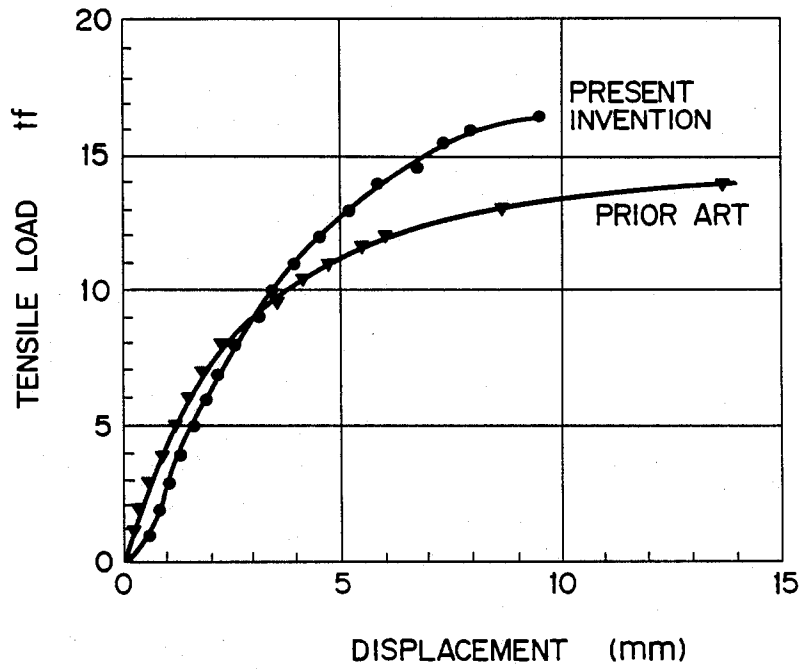
FIG. 1



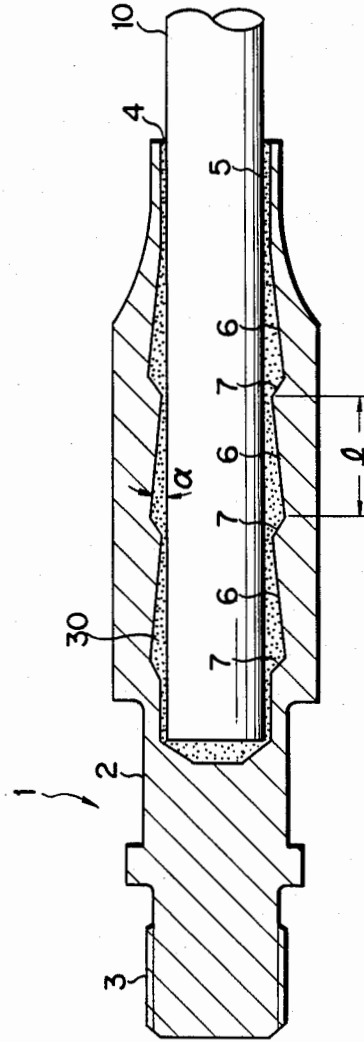
F I G. 2 A



F I G. 2 B



F I G. 3



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FIG. 4

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