



[54] STENT CRIMPING TOOL AND METHOD OF USE

[75] Inventors: Daniel G. Brown, Temecula; Stephen A. Morales, Santa Clara, both of Calif.

[73] Assignee: Advanced Cardiovascular Systems, Inc., Santa Clara, Calif.

[21] Appl. No.: 09/196,534

[22] Filed: Nov. 20, 1998

[51] Int. Cl.⁷ B21D 39/04; B23P 11/00

[52] U.S. Cl. 29/516; 29/282; 72/90; 606/1

[58] Field of Search 72/88, 90, 94; 29/516, 517, 270, 282, 283.5; 606/1

[56] References Cited

U.S. PATENT DOCUMENTS

696,289 3/1902 Williams .
2,964,088 12/1960 Erath 72/90
4,455,854 6/1984 Ermolovich 72/90
4,468,224 8/1984 Enzmann et al. .
4,576,142 3/1986 Schiff .
4,644,936 2/1987 Schiff .
4,681,092 7/1987 Cho et al. .
4,697,573 10/1987 Schiff .
4,901,707 2/1990 Schiff .
4,907,336 3/1990 Gianturco 29/515
5,132,066 7/1992 Charlesworth et al. .
5,133,732 7/1992 Wiktor 606/1
5,183,085 2/1993 Timmermans 140/89
5,189,786 3/1993 Ishikawa et al. 29/283
5,437,083 8/1995 Williams et al. 606/1
5,546,646 8/1996 Williams et al. 29/516
5,626,604 5/1997 Cottone, Jr. 606/108
5,630,830 5/1997 Verbeek 606/108
5,653,691 8/1997 Rupp et al. 606/194
5,672,169 9/1997 Verbeek 606/1
5,725,519 3/1998 Penner et al. .
5,738,674 4/1998 Williams et al. 606/1
5,746,764 5/1998 Green et al. 606/108
5,759,474 6/1998 Rupp et al. .

5,783,227 7/1998 Dunham .
5,785,715 7/1998 Schatz 606/1
5,787,572 8/1998 Toms 29/282
5,810,873 9/1998 Morales 606/1
5,836,952 11/1998 Davis et al. 606/108
5,920,975 7/1999 Morales 29/282

FOREIGN PATENT DOCUMENTS

630 623 A2 12/1994 European Pat. Off. .
826 346 A1 3/1998 European Pat. Off. .
0 873 731 A1 10/1998 European Pat. Off. .
0 938 877 A2 9/1999 European Pat. Off. .
464004 8/1928 Germany 72/88
159065 1/1921 United Kingdom .
WO 98/14120 4/1998 WIPO .
WO 98/19633 5/1998 WIPO .

OTHER PUBLICATIONS

The eXTraordinary Stent, C.R. Bard Brochure (undated).

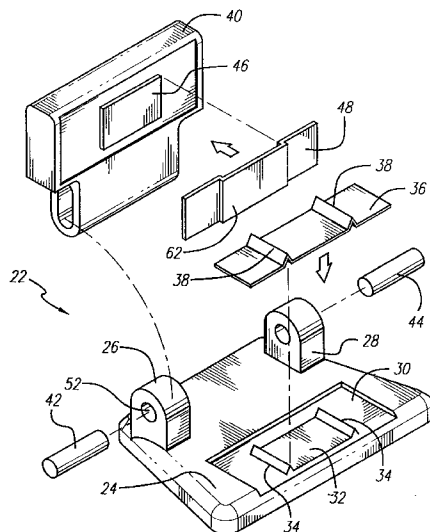
Primary Examiner—Daniel C. Crane

Attorney, Agent, or Firm—Fulwider Patton Lee & Utecht, LLP

[57] ABSTRACT

A hand held tool for crimping a stent onto a balloon of a catheter is disclosed. The stent crimping tool is operated in one hand by squeezing two plates together while simultaneously displacing the plates linearly to crimp and roll the stent held between the plates. Specifically, the crimping tool includes a base plate with two bosses through which respective pins pass linking the base plate to a compression plate. The compression plate has elongated diameter openings at opposite sides thereof to receive the pins. With the elongated diameter openings, the compression plate can pivot at the pins and translate linearly relative to those pins thus enabling the rolling action during the crimping process. A compression profile pad and a tapered profile pad are attached to the crimping areas of the plates to grip and together apply pressure to the uncrimped stent held therebetween. The pads may include specific contours in order to impart a desired profile to the crimped stent.

23 Claims, 4 Drawing Sheets



EDWARDS LIFESCIENCES EX 1004

FIG. 1

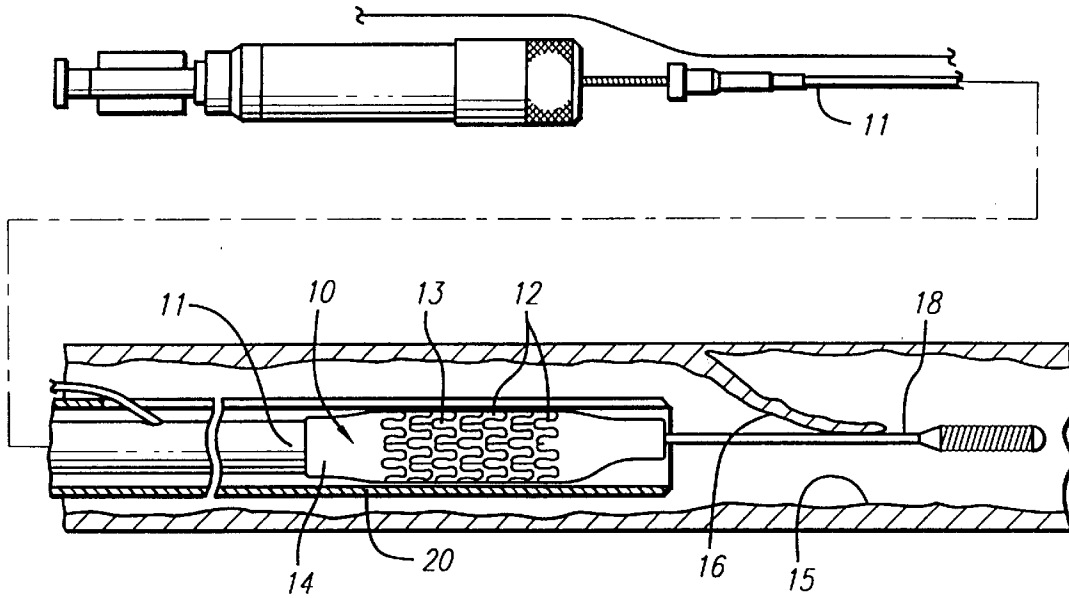
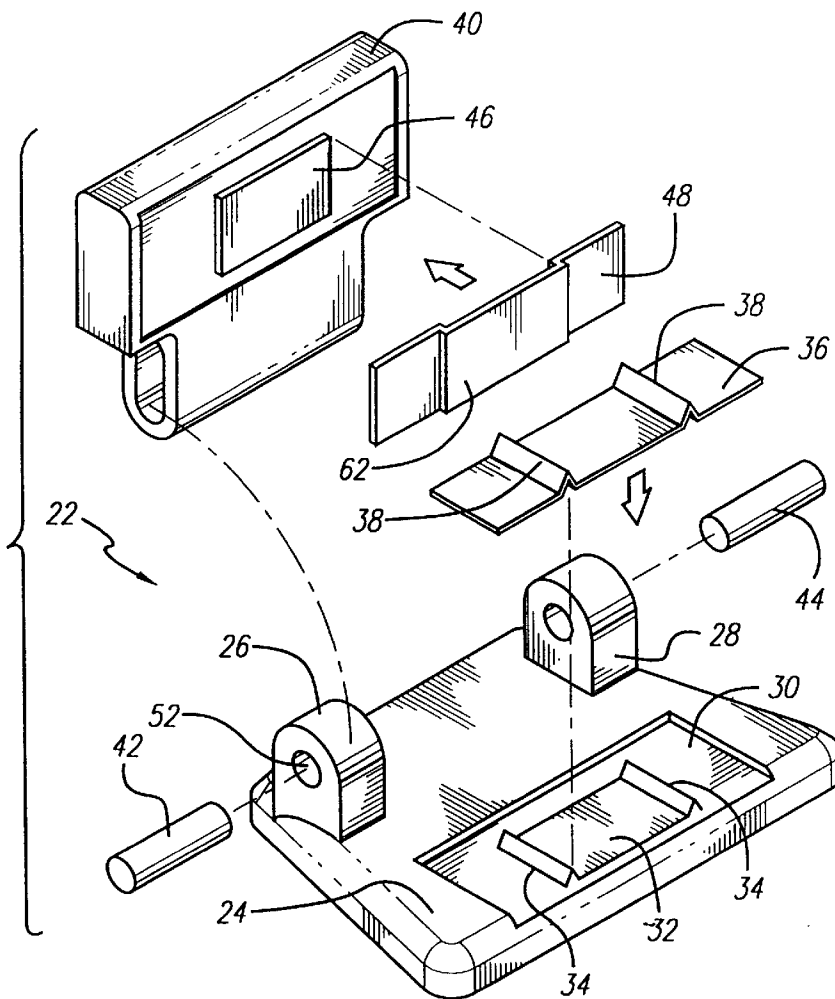


FIG. 2



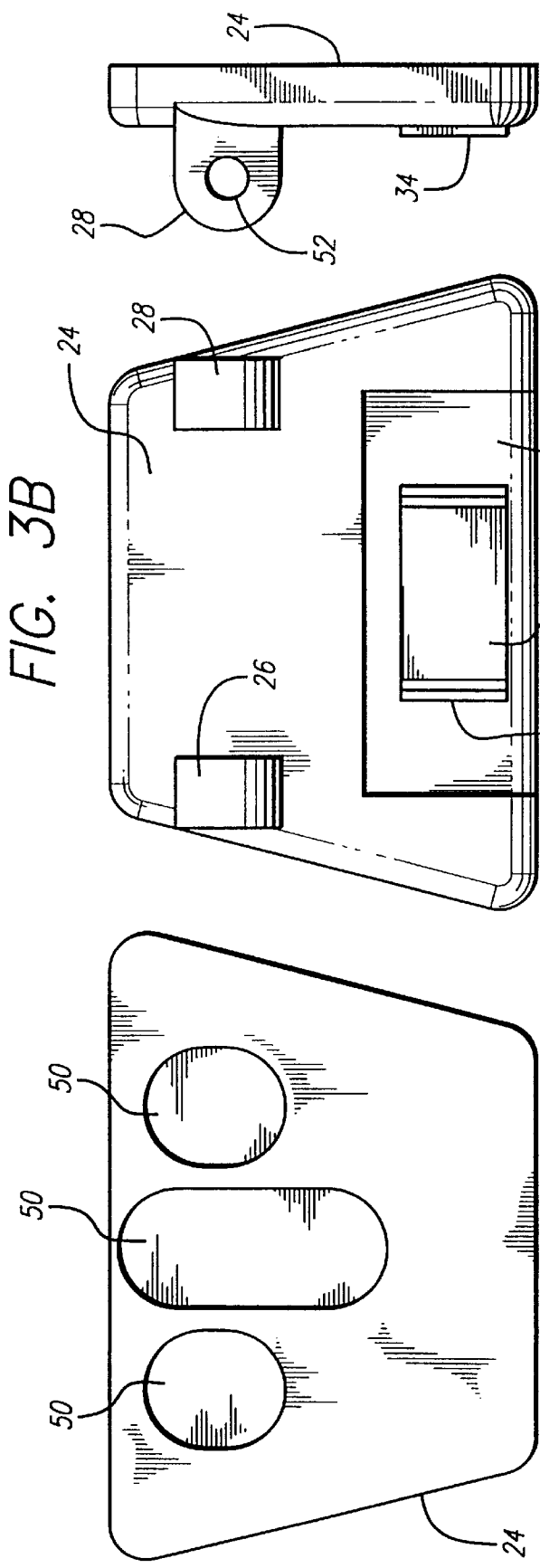


FIG. 3A

FIG. 3B

FIG. 3D

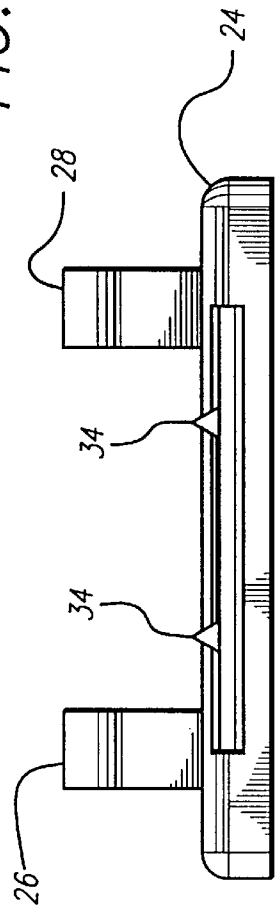


FIG. 3C

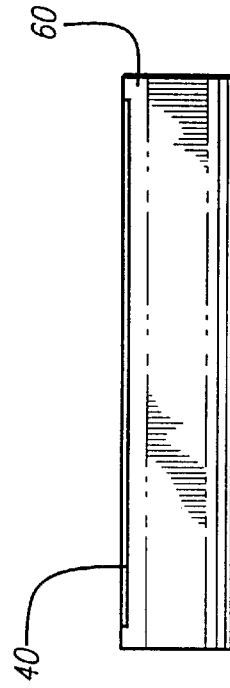
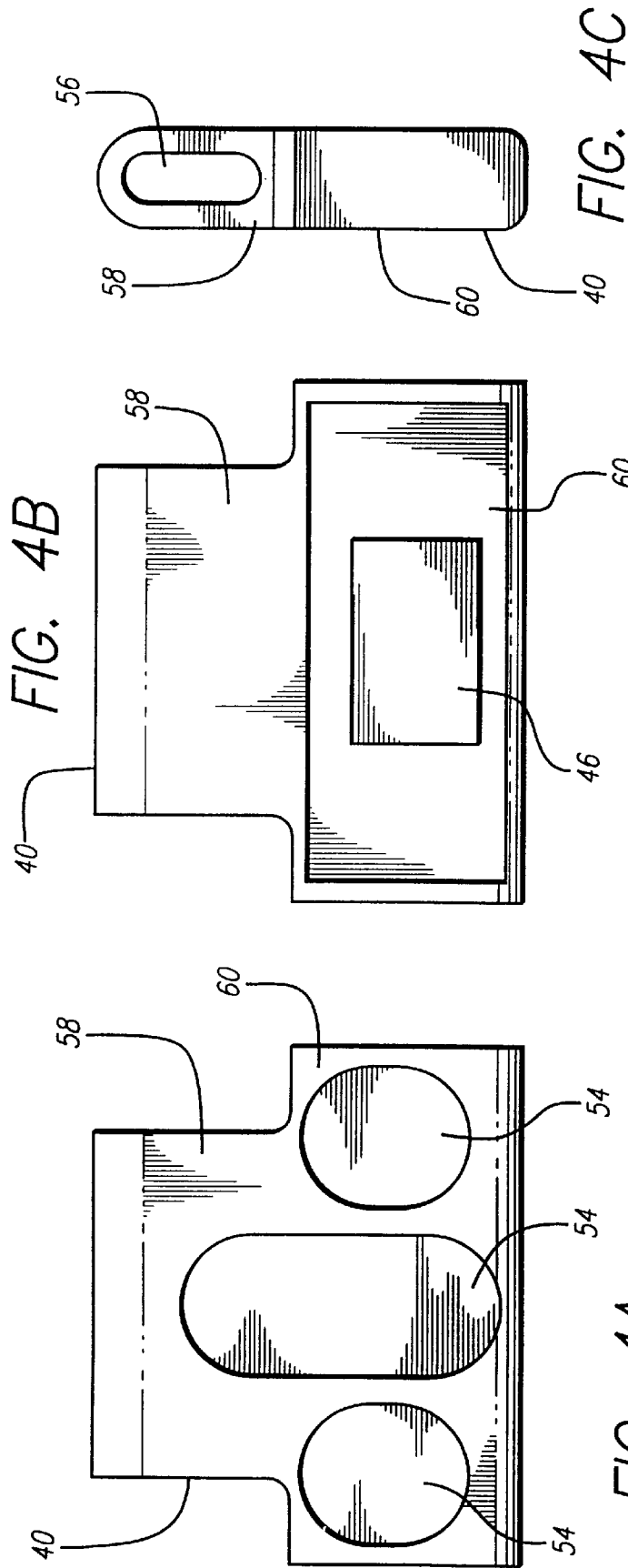


FIG. 4D

FIG. 4C

FIG. 4B

FIG. 4A

FIG. 5A

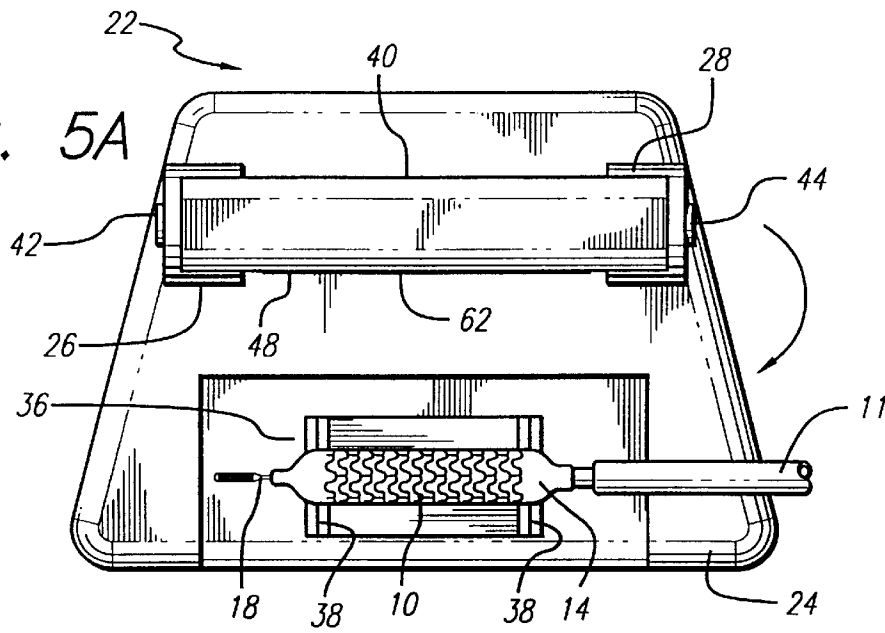


FIG. 5B

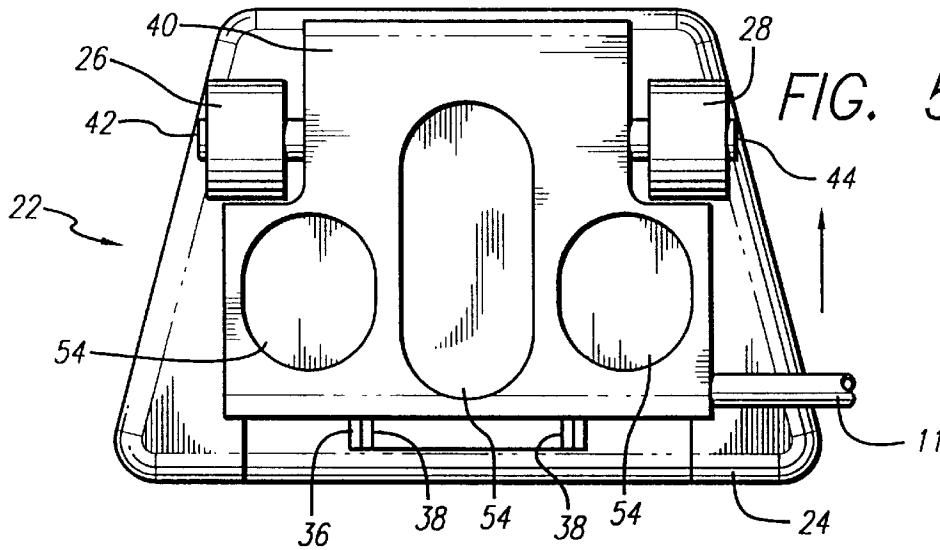
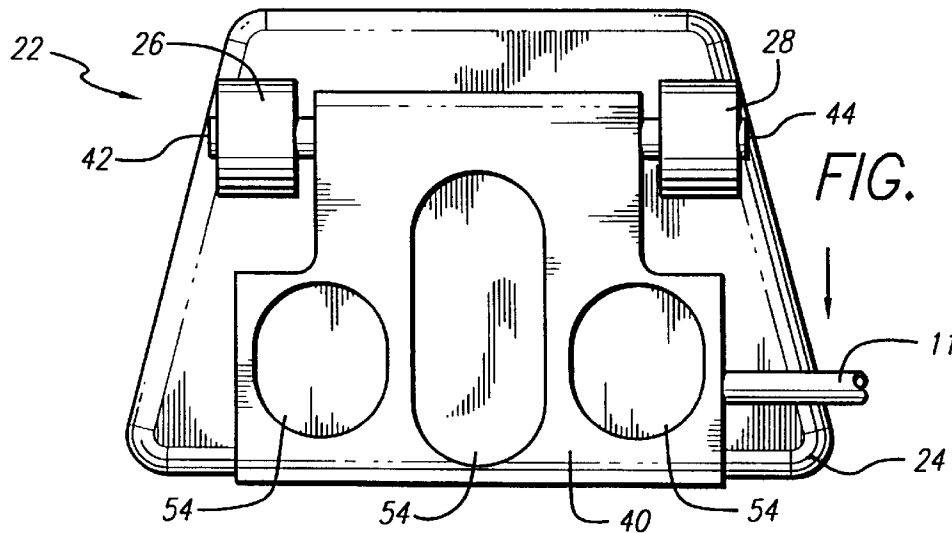


FIG. 5C



Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.