



US00D645936S

(12) **United States Design Patent**  
**Shepherd**

(10) **Patent No.:** **US D645,936 S**

(45) **Date of Patent:** **\*\* Sep. 27, 2011**

(54) **NOZZLE TUBING HAVING OFFSET NOZZLES**

(75) Inventor: **Donald W. Shepherd**, Shelbyville, KY (US)

(73) Assignee: **Caldwell Tanks, Inc.**, Louisville, KY (US)

(\*\*) Term: **14 Years**

(21) Appl. No.: **29/362,440**

(22) Filed: **May 25, 2010**

(51) **LOC (9) Cl.** ..... **23-01**

(52) **U.S. Cl.** ..... **D23/213**

(58) **Field of Classification Search** ..... D23/213, D23/228; 239/548, 550, 566; 261/115  
See application file for complete search history.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

2,802,543 A 8/1957 Clark  
(Continued)

**FOREIGN PATENT DOCUMENTS**

WO 98047604 10/1998

**OTHER PUBLICATIONS**

Shepherd, Donald W.; Fraser, Donald; Impact of Heat Rate, Emissions and Reliability from the Application of Wet Compression on Combustion Turbines; 2005; pp. 1-6; US.

(Continued)

*Primary Examiner* — Robin V Webster

(74) *Attorney, Agent, or Firm* — Robert H. Eichenberger; Scott W. Higdon; Middleton Reutlinger

(57) **CLAIM**

The ornamental design for a nozzle tubing having offset nozzles, as shown and described.

**DESCRIPTION**

This application is related to the following co-pending Applications: application Ser. No. 12/787,243, filed May 25, 2010

and entitled Removable Misting Array for an Abatement System; application Ser. No. 12/787,374, filed May 25, 2010 and entitled System and Method for Repairing or Servicing a Misting Array Assembly of an Abatement System; application Ser. No. 12/787,372, filed May 25, 2010 and entitled Misting Array Assembly Having Adjustable Nozzles; application Ser. No. 12/787,373, filed May 25, 2010 and entitled Misting Array Assembly Having Upwardly and Downwardly Disposed Nozzles; application Ser. No. 29/362,443, filed May 25, 2010 and entitled Nozzle Tubing Having Offset Nozzles; application Ser. No. 29/362,444, filed May 25, 2010 and entitled Misting Array Frame Structure; and application Ser. No. 29/362,442, filed May 25, 2010 and entitled Sealing Structure for Blocking an Opening.

FIG. 1 is an upper rear perspective view of a nozzle tubing having offset nozzles of the present invention;

FIG. 2 is a lower front perspective view of the nozzle tubing having offset nozzles of FIG. 1;

FIG. 3 is a left side view of the nozzle tubing having offset nozzles of FIG. 1;

FIG. 4 is a section view of the nozzle tubing taken along the section line 4-4 of FIG. 1; the sectioned internal portions of the nozzle tubing are shown for illustrative purposes only and form no part of the claimed design;

FIG. 5 is a top view of the nozzle tubing having offset nozzles of FIG. 1;

FIG. 6 is a bottom view of the nozzle tubing having offset nozzles of FIG. 1;

FIG. 7 is a rear plan view of the nozzle tubing having offset nozzles of FIG. 1;

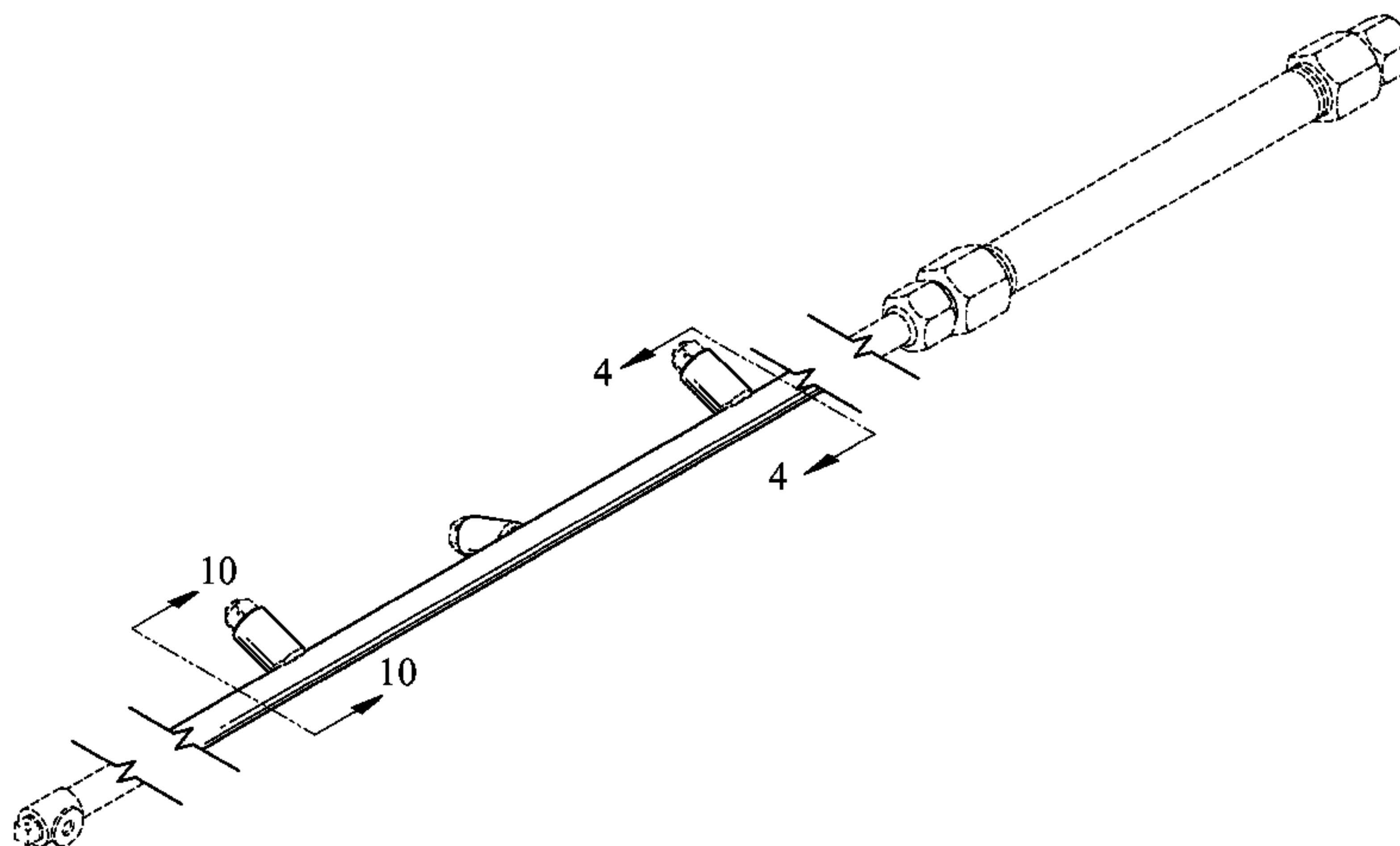
FIG. 8 is a front plan view of the nozzle tubing having offset nozzles of FIG. 1;

FIG. 9 is a right side view of the nozzle tubing having offset nozzles of FIG. 1; and,

FIG. 10 is a section view of the nozzle tubing taken along the section line 10-10 of FIG. 1; the sectional internal portions of the nozzle tubing are shown for illustrative purposes only and form no part of the claimed design.

The broken lines showing nozzle tips, nozzle bases, and environmental structure are for illustrative purposes only and form no part of the claimed design. The nozzle tubing is shown fragmented to indicate indeterminate length.

**1 Claim, 8 Drawing Sheets**



# US D645,936 S

Page 2

## U.S. PATENT DOCUMENTS

3,419,251 A 12/1968 Eckert  
3,522,000 A 7/1970 Kinney  
4,211,735 A 7/1980 Berlin  
4,247,308 A 1/1981 Calvert et al.  
4,343,771 A 8/1982 Edwards et al.  
D310,860 S \* 9/1990 Delepine ..... D23/213  
D311,053 S \* 10/1990 Delepine ..... D23/213  
D311,054 S \* 10/1990 Delepine ..... D23/213  
4,980,099 A 12/1990 Myers et al.  
5,065,944 A 11/1991 D'Amato  
5,069,691 A 12/1991 Travis et al.  
D353,873 S \* 12/1994 Schoeneman ..... D23/213  
5,387,376 A 2/1995 Gasser  
5,433,763 A 7/1995 Shagott et al.  
5,465,537 A 11/1995 Fullwodd  
5,523,028 A 6/1996 Reens et al.  
5,648,048 A 7/1997 Kuroda et al.  
5,651,502 A \* 7/1997 Edwards ..... 239/450  
5,867,977 A 2/1999 Zachary et al.  
5,930,990 A 8/1999 Zachary et al.  
6,007,604 A 12/1999 Risse  
6,051,055 A \* 4/2000 Ukawa et al. .... 96/322

6,076,739 A 6/2000 Littleford et al.  
6,230,091 B1 \* 5/2001 McQuinn ..... 701/50  
6,344,177 B1 2/2002 Littleford  
6,613,133 B2 9/2003 Piaskowski et al.  
6,719,829 B1 4/2004 Schwab  
6,857,268 B2 2/2005 Stinger et al.  
D503,772 S \* 4/2005 Mody et al. .... D23/213  
6,946,021 B2 9/2005 Aoyagi  
7,096,665 B2 8/2006 Stinger et al.  
D588,711 S 3/2009 Ryba  
D616,110 S 5/2010 Rimsky  
2009/0320440 A1 12/2009 Erickson et al.

## OTHER PUBLICATIONS

Jolly, Sanjeev; Wet Compression—A Powerful Means of Enhancing Combustion Turbine Capacity; Presented at Power-Gen International; Dec. 2002; pp. 1-12; Florida, US.  
Gajjar, Hemant; Chaker, Mustapha; Dighe, Ajay; Meher-Homji, Cyrus B.; Proceedings of ASME Turbo Expo 2003; Inlet Fogging for a 655 MW Combined Cycle Power Plant-Design, Implementation and Operation Experience; Jun. 2003; pp. 1-9; Georgia, US.

\* cited by examiner

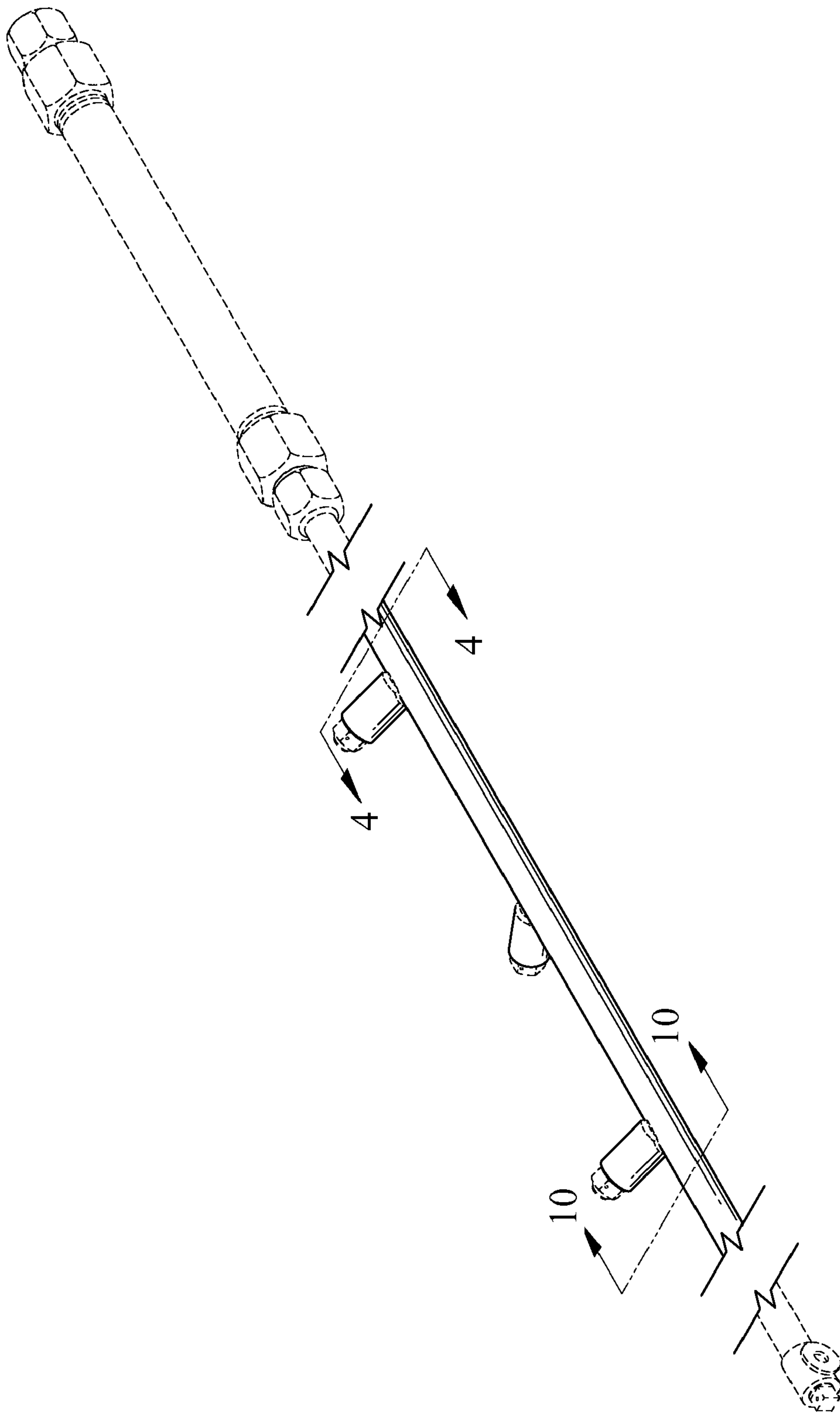


FIG. 1

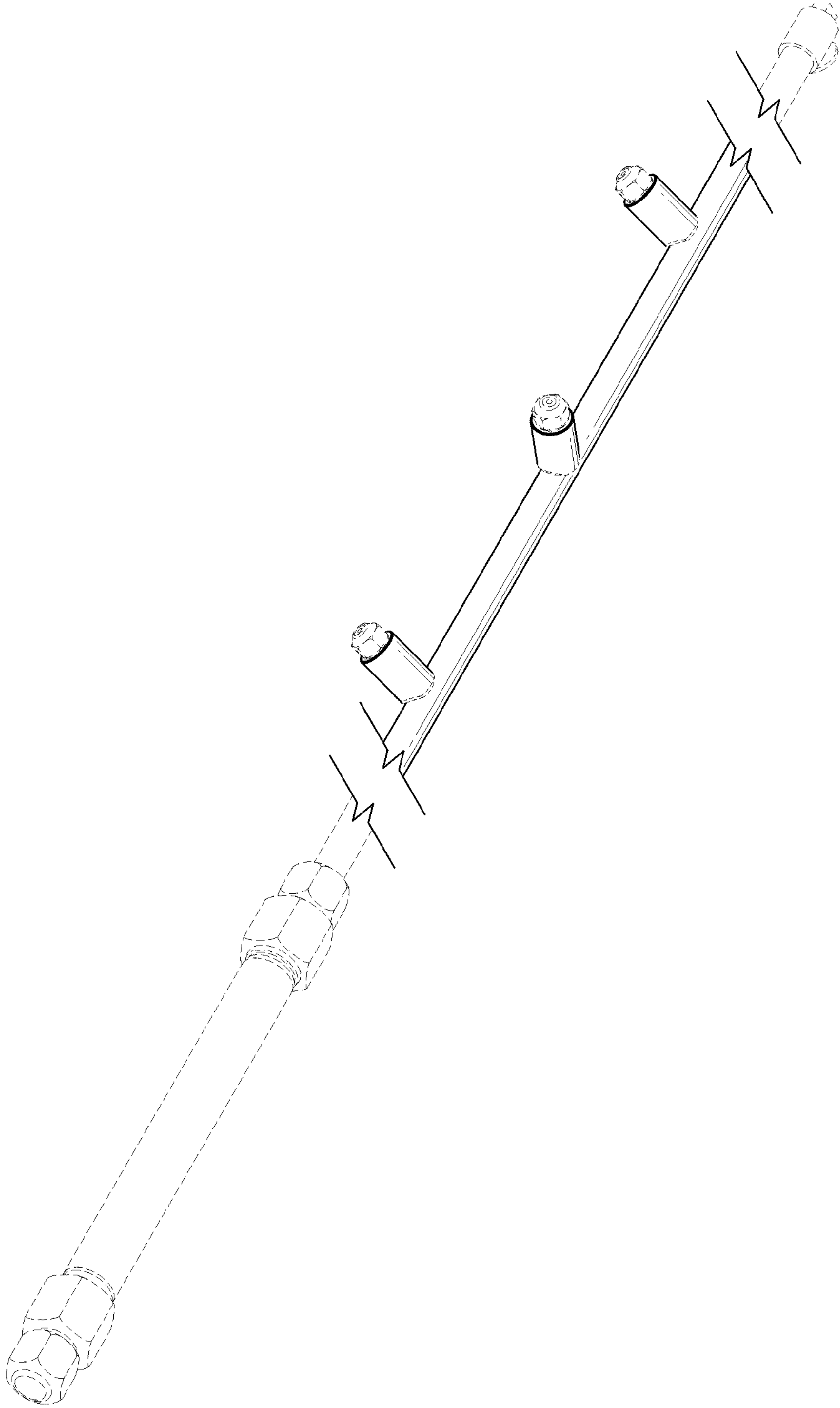


FIG. 2



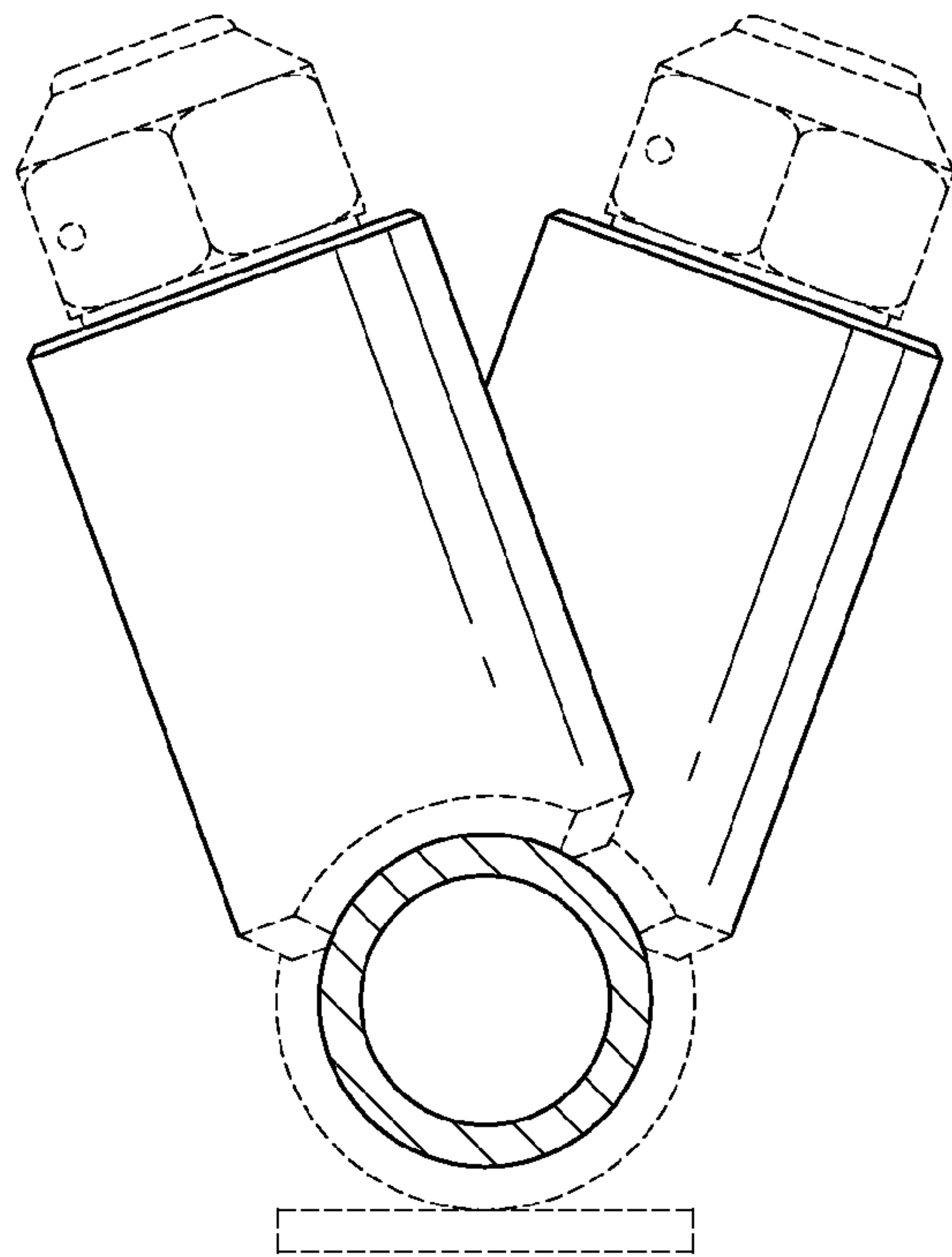


FIG. 4

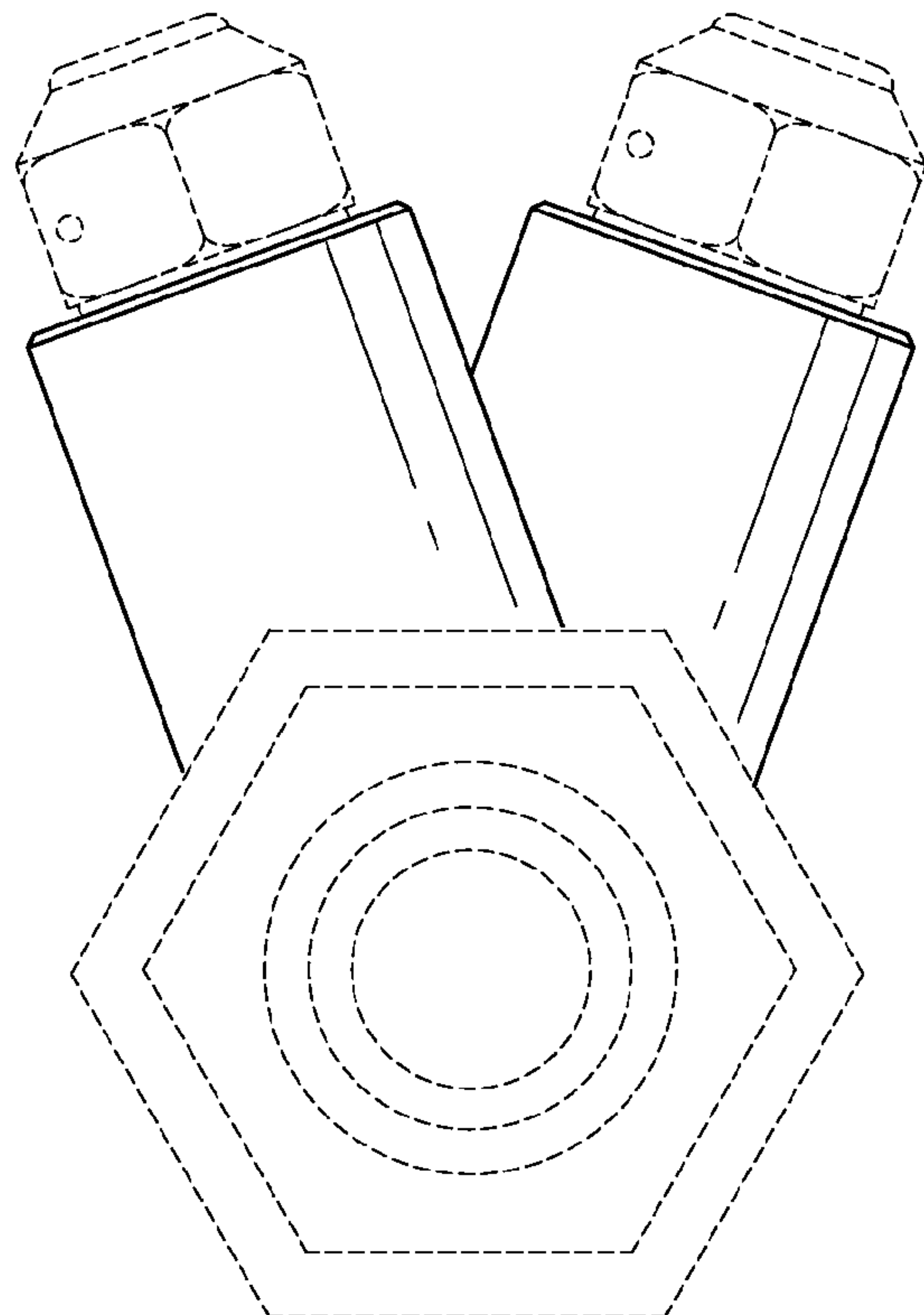


FIG. 3

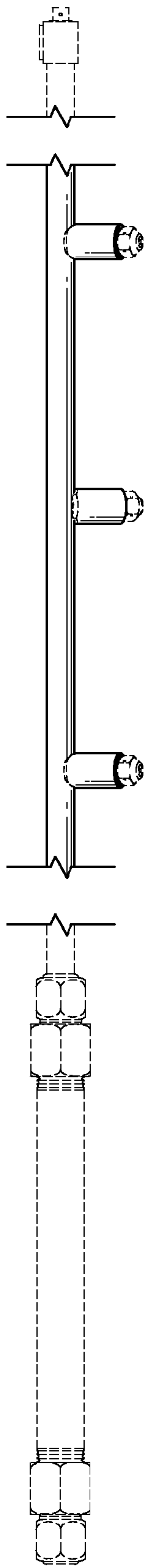


FIG. 5

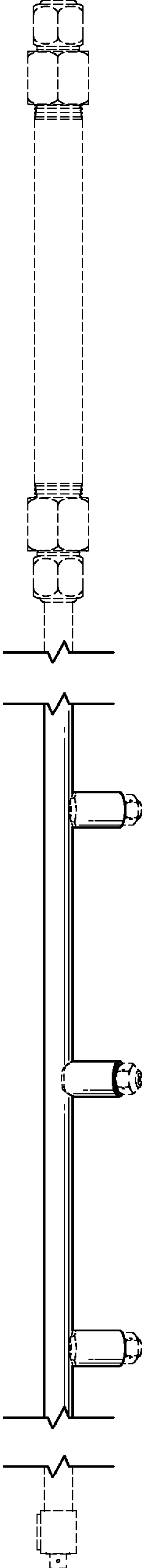


FIG. 6

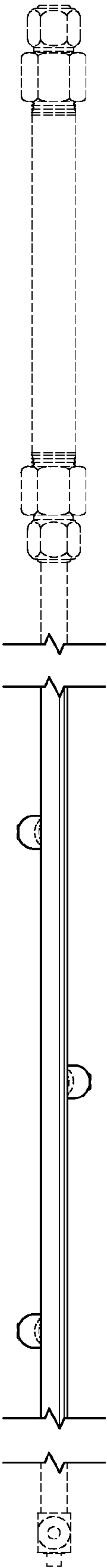


FIG. 7



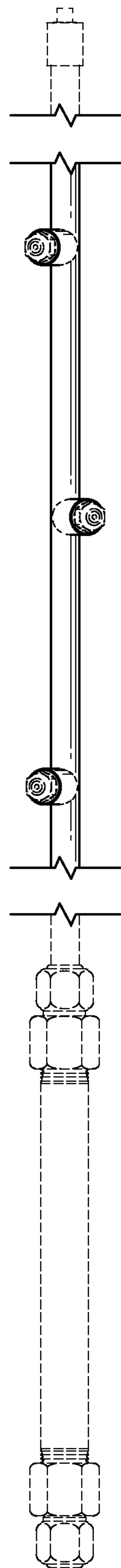


FIG. 8

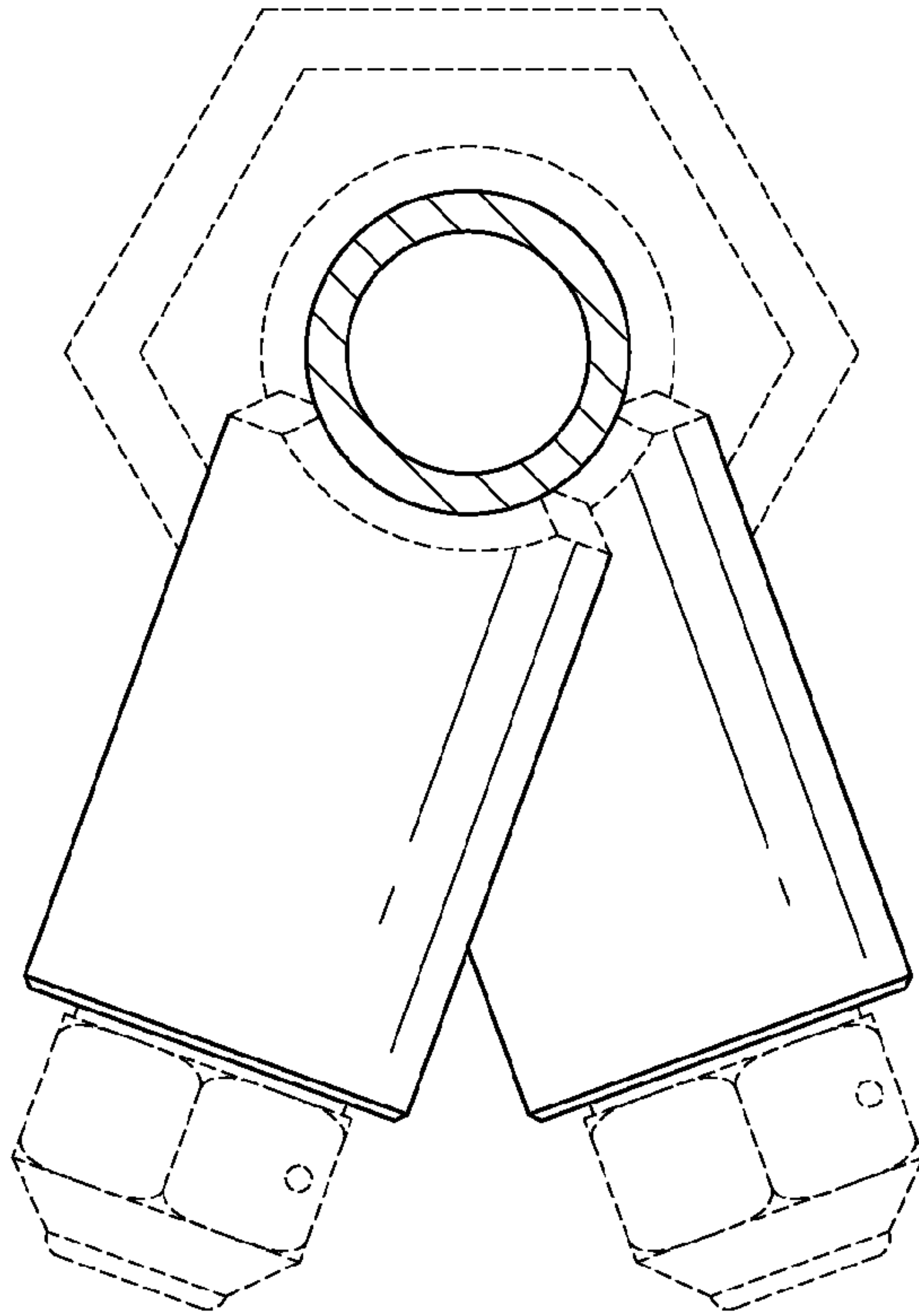


FIG. 10

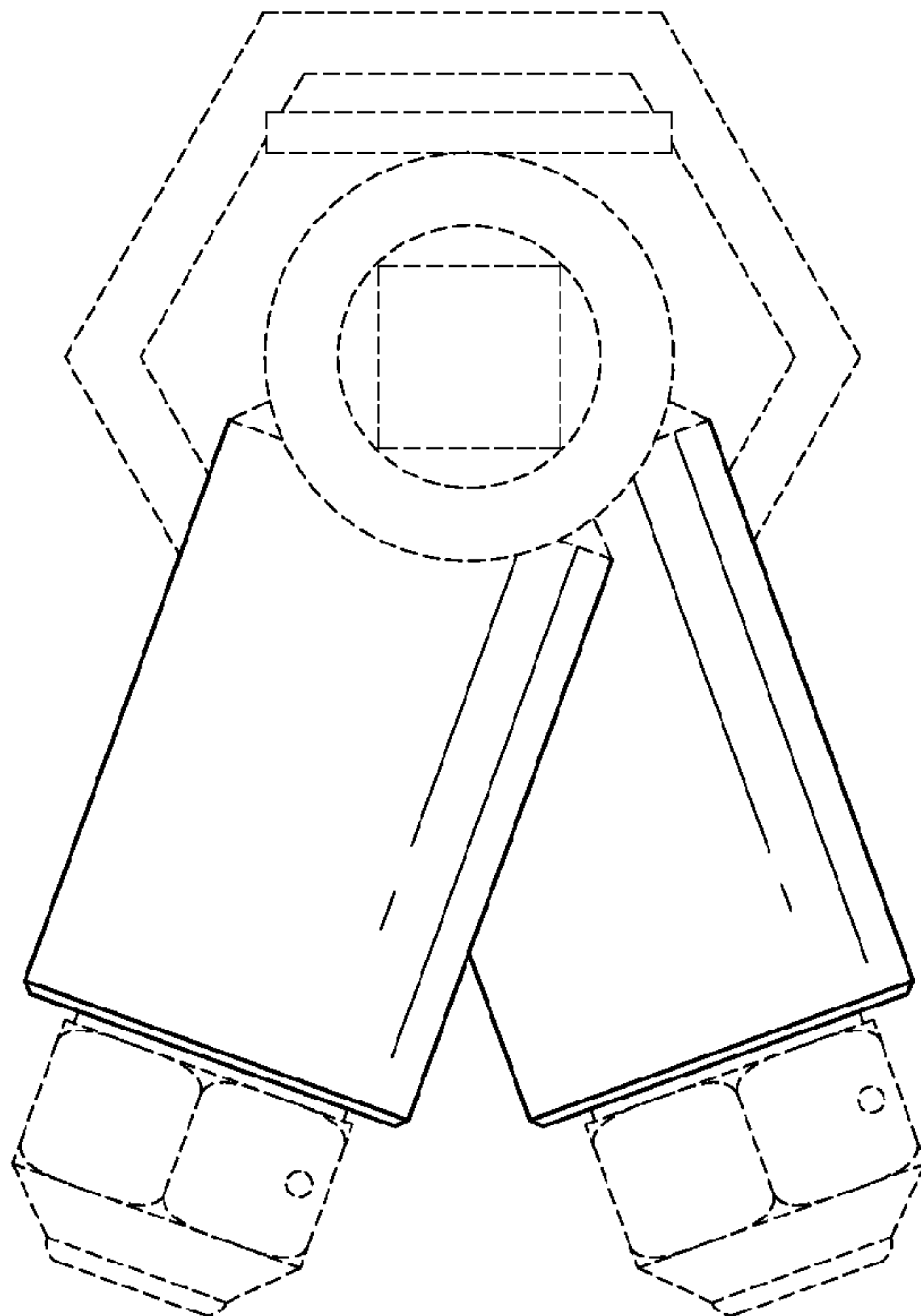


FIG. 9