专利文献检索

罗瑞 编

PATENT DOCUMENT RETRIEVAL

石家庄矿山机械研究所

专利文献检索

罗瑞编

石家庄矿山机械研究所

前　言

专利这个词，英文叫“Patent”，专利一词通常表示三个意思，一是指取得专利权的发明或者实用新型；二是指取得法律保护的专利权或者称为专利使用独占权；三是指专利文献。

专利文献是广大科研、设计、情报人员很需要了解的一项技术资料。利用专利帮助工厂企业和科研设计单位开发产品、增加品种、提高水平是重要情报信息来源。

在专利文献库中查找所需要的技术资料，这一过程叫检索。检索是一种用途广泛的基本程序设计操作。这本资料可以帮助读者系统了解专利文献基本知识，认识专利文献检索系统，熟悉世界专利分类体系、国际专利分类法以及美国、苏联、日本等国专利文献检索工具使用方法，结合实例介绍专利文献查阅方法。

愿广大科技人员都来利用专利文献，不断更新知识，推进技术创新，为建设社会主义四个现代化作出贡献。

编写这份资料的工作，曾得到中国专利局文献服务中心工作同志的热心指导，在此表示衷心感谢。

这本资料是由石家庄矿山机械研究所罗瑞编写的。有遗漏和错误之处，请读者给予指正。

一九八五年六月

目　录

一、专利文献概论

1—1 专利文献产生和发展

自从1624年英国制定了世界上具有现代雏型的第一部专利法，三百多年来各国专利法演变历史证明，专利制度并不属于资本主义范畴。它可以为不同社会制度的国家服务。由于经济技术和国际贸易的迅速发展，专利制度已经成为国际范围内的一项重要管理制度。1883年法国等11国签订保护工业产权巴黎公约（PCPIP），到1984年初成员国已达93个。1970年成立了世界知识产权组织（WIPO），到1984年初已有106个成员国，我国于1980年加入该组织。1970年美国等35国签订国际专利合作条约（PCT），1977年在西欧成立了欧洲专利局（EPO）。专利制度已为全世界绝大多数国家采用，目前已有158个国家和地区建立了专利制度。

专利文献正是伴随着专利制度实施而产生的，它的发展是同技术进步和经济繁荣密切相关的。英国十六、十七世纪每年平均批准三、五件专利，到二十世纪初每年平均批准专利超过一万件。据统计，1980年批准量超过一万件的国家有美国（61827件，1984年为72651件），加拿大（23897件），联邦德国（20188件），英国（23804件），法国（28050件），苏联（1572／93010件），日本（46106件）等国。日本是1885年开始实施专利制度，当年提出专利权申请的只有425件，到1981—1983年，申请件数达到平均每年14万件，从而给审批工作带来很大压力。目前日本的专利申请件数已占世界总件数的40%，成为首屈一指的专利大国。随着科学技术“爆炸”式的发展和尖端技术领域竞争的“白热化”，申请专利的件数每年都在急剧增加（《经济参考》1985．5．7）。

近年，苏联每年产生和推广的专利文件有95万件，专利情报占科学技术情报的三分之一。如今及时地从大批科技情报中抽取出研究人员和工程师们必不可少的资料是越来越不容易了。它们常常重复地发表在杂志和书籍中，因此，获得必要材料也越来越复杂。

现在对于专家来说，仅仅熟悉本学科，本职范围内的情况，已经不够了。现在百分之四十的情报必须从相近，有时是遥远的知识领域去吸取。这里没有“信息领航术”简直寸步难行。因此有必要在国内建立起强大的“信息工业”，这门工业能够处理不断增加的大批资料，并能合理分配这些资料。否则，保证科技进步所需要的新发明就有成为死财产的危险。为了在实践中积极推广这些资料，在世界范围和工业发达国家内已经成立了多个规模较大的技术情报检索系统。

中国专利法从1985年4月1日开始实施。规定保护发明、实用新型和外观设计三种专利。截止5月10日中国专利局已收到专利申请4700多件，4月1日专利法实施的第一天，就收到了专利申请3540件。据统计，中国专利局在4月份收到专利申请4352件，其中申请发明专利占3／4，国外申请占1／3，国内个人申请占1／4，职务发明创造申请占3／4，专利制度显示出技术和经济的活力，开始结出丰硕果实。

关于发明创造的含义

中国专利法规定了保护发明，实用新型和外观设计三种专利。

①**发明**：为了满足人类需求而利用自然规律做出的创造性的技术方案。

技术与科学不同，通俗地讲，了解认识自然规律的知识体系是科学，利用控制自然规律的知识是技术。例如对某种物质受激发光的规律的认识是一门科学，不是一种技术。而对这种认识的具体应用，如激光打孔器，激光手术刀，激光测距仪等才叫技术。

发明的类别有：产品发明和方法发明。

产品发明指的是人造的物品。

方法发明指的是为制造产品或者为解决某个技术课题而创造的一系列的行为过程。产品制造方法的过程完结一般表现为制成产品，也有一些方法过程完结并不表现为制成产品，如测试方法，结果只是读出数据。

②**实用新型**：对产品的形状、构造或其结合所提出的适于实用的新方案。实用新型没有方法，都是产品，并且是具有一定的形状、构造的产品。象液体、气体和无固定形状的固体如面粉、砂子等都不能作为实用新型的对象。日本是实用新型专利最多的国家。

实用新型专利有许多积极作用，如保护小发明，有利于商品的改进和市场竞争，一种产品的小改小革可带来不可低估的经济效益。日本松下电器公司就是靠小发明起家的，东芝、三菱大公司也曾用小发明摆脱经济困境。实用新型专利调动人们的发明创造积极性，只要肯动脑筋是人人有可大为的。鼓励人们勤于思考问题，大量的是日用品、机械和电子产品方面，对于丰富人民的物质文化生活有着积极的意义。

③**外观设计**：对产品的形状、图案、色彩或其结合作出的富有美感并适于工业上应用的新设计。如图案用到暖瓶、茶具、床单上才算外观设计，泥塑贝雕若不能用工业方法生产，有美感也不能属于外观设计专利。

以上三种发明创造之间既有区别也有联系。总之，发明专利要求创造性的程度要高于实用新型专利。

关于专利权的基本特征

专利的核心问题是专利权，专利权具有三个基本特征：

①**时间性**，各国对于专利的有效期都有一定的限制，一般为10—20年不等。我国专利法规定“发明专利权的期限为十五年，自申请日起计算。实用新型和外观设计专利权的期限为五年，自申请日起计算，期满前专利权人可以申请续展三年”。期限届满以后，专利权自行终止，任何人均可利用。

②**地域性**，专利法规定专利权有严格的地域性，在没有其他条约存在的情况下，专利的有效范围仅限于专利权授于国的领土上，就是说在那个国家申请和被批准的专利，只是在该国的法律管辖的范围内受到保护，而在那些未曾授于专利权的国家，任何人使用该发明，无须得到专利权人的同意或支付使用费。

③**专有性**，也称垄断性或独占性，专利权是按专利法授于发明人在一定期限内的专

有权。专利权具有排他性，即专利权人对专利产品的制造、使用、销售以及专利方法的使用享有独占权。未经专利权人的同意，任何人都不能制造、使用或销售已获得专利权的发明，否则就是对专利权的侵犯，侵权人不但要赔偿损失，情节严重的还要受到法律的制裁。

保护工业产权巴黎公约第四条之二规定：就同一发明在不同国家取得的专利是互相独立的。也就是说，在我国只保护我国审查批准授予专利权的那些专利。

关于实质性审查基准

中国专利法实施细则进一步明确了已有的技术不能再申请专利，只有新作出的发明创造才能得到专利权的保护。发明创造的客观标准是同时具有新颖性、创造性和工业实用性。

①新颖性

绝对新颖性：把新颖性的衡量标准扩大到世界范围的。

相对新颖性：新颖性的衡量标准仅限于一个国家或者地区范围的。

中国专利法采用混合的新颖性标准。对于在出版物公开发表而为公众所知的，采用绝对标准，如“国内外出版物公开发表过”则失去新颖性。对于公开使用或以其它方式为公众所知的，则采用相对新颖性标准，即仅限于调查国内的情况。

出版物，指出版发行为目的的印刷品，包括缩微胶片等。

公开发表，指在不保密的出版物上发表。

公开使用，指非保密状态使用或由不负保密责任的任何人使用。

其它方式为公众所知，指出版物以外的方式如照片、电影、录相、录音为载体的公开传播，或以报告、演讲、坐谈、陈列、示范等方式为公众所知。

公众，指对发明专利申请人在法律上不承担保密责任的一切人。

使用，指在生产经营、科研、教学或其他方面的制造、使用或销售。

②创造性

实际上专利审查员是这一概念的具体体现者，所依据的客观标准是专利局编写的标准手册。

③工业实用性

中国专利法强调应用的积极效果，作理论上的推论或估计，排除明显无应用可能的技术方案和无意义的“发明创造”。例如“永动机”。

专利申请案经过实质性审查通过，便在“专利公报”上刊出，同时出版专利说明书。在实质性审查之前，经初步审查合格后，自申请日起不超过18个月公布。自公布专利申请到批准专利权，需经过一段时间，最少1—2年，最多5—6年。

1—2　专利文献类型

专利文献包括：专利说明书，专利文摘、专利公报、索引和分类表，以及专利申请和审批程序中产生的所有文件。但一般所谈专利文献，常常是单指专利说明书而言。

专利说明书分为：发明申请说明书，发明专利说明书，实用新型专利说明书和外观设计专利。

专利说明书是专利文献的主要组成部分。国外每年出版的专利说明书约为100万件，除去重复和正在审批的专利，新专利每年至少有30万件。全世界累积的专利说明书约2700万件，目前尚在有效期的专利约350万件。〔1〕

专利说明书不作理论阐述，专利权人在写详细说明书时多半写得很巧妙，使人无法断定这项专利是不能实施的，因此看不出是否已被采用以及实际经济效果。但可以了解发明技术细节水平。专利说明书也不是发明的原技术文件，一般是由专职代理人按照规范起草，（ISO制订INID）。其数据是概略的，然而所叙述的原理、过程、图解较为可靠，可作重要分析参考。一件专利就是一项发明，一个产品包含许多项专利。

实践证明，专利说明书是广大科研、情报技术人员很感兴趣的一项科技文献，是涉及课题及工业产品的第一手资料，是科技情报的重要来源之一，它反映出世界水平及近代技术，新工艺、新设备、新材料的最新动态。

国外专利文献大部分国内都有收藏，比较完整的单位有：中国专利局文献馆、中国科学技术情报所、北京文献服务社、北京图书馆、中国科学院图书馆、机械工业部科技情报所、上海科技情报所、中国科技情报所重庆分所等单位。

中国专利局文献馆已收藏了1965年以来的十多个国家的专利说明书约1000多万件（列附录一）。有美、英、日、法、联邦德国、苏联、瑞士、瑞典、澳大利亚、奥地利、加拿大、罗马尼亚、民主德国、捷克等国家和国际专利合作条约（PCT）、欧洲专利局（EPO）的专利说明书；中国科技情报所重庆分所收藏有1964年以前美、英、日、法、苏联、意大利、比利时、荷兰等十多个国家的专利说明书约500万件，上海科技情报所也收藏有近十个国家的专利说明书约900万件。PB报告由中国科学院图书馆入藏，有缩微平片。PB报告对理论分析、试验、设备、工作方法、实验结果和结论都很详尽。

专利文献按载体不同可分为书本式（纸型），缩微胶片型（平片和胶卷），磁带型。书本式容易阅读，但占地面积大，胶片型储藏方便，在缩微胶卷阅读器上阅读，也可以复制文件，磁带型用于计算机终端检索。

书本式专利说明书的格式和内容按ISO制订INID规范书写。著录项目是非常重要的，其识别代码是国际统一的。如：

〔11〕专利号或公告号
〔21〕专利申请号
〔31〕专利优先权号
〔51〕国际专利分类号
〔22〕专利申请日
〔32〕优先申请日
〔42〕审定日期

〔45〕批准日
〔71〕申请人
〔72〕发明人
〔74〕代理人
〔75〕发明人又是申请人

专利说明书的内容和格式：

扉页　　标头

正文　　详述发明内容所属专业、主要用途，技术措施及所解决问题，同时指出其优缺点，结合附图说明基本原理，然后提出最优方案。（qreferred Eorbodimert），并列举具体作法。有长达300页也有短至50个字。

权利要求，即权项，是专利说明书核心，用严格的语言分条列出专利的权限内容，提出法律要求。

附图　原理结构图，没有实际尺寸，图幅可多可少，有多达1000幅的。

实用新型说明书只有权利要求和附图。

一件专利说明书的主要内容大致可归纳如下：

1．发明的技术内容；

2．关于工业方面有待解决问题的描述。当研究人员了解了这些问题后，就可考虑新的研究途径或改良途径；

3．描写发明的现有技术水平的情报；

4．介绍竞争者研究方向的情报，从中可以间接地了解有关技术领域里的市场前景。

专利说明书除提供资料情报外，还提供法律情报，说明专利权的范围及由于有了这些权利，在哪些方面有进行自由应用的可能性。

示例：美国专利说明书格式

扉页　　上著录事项：

United States Patent 〔19〕　　〔11〕4,311,969

Kolb　　〔45〕Jan.19,1982

〔54〕 GAS LASER ASSEMBLY

〔75〕Inventor: William P. Kolb, Carlsbad, Calif

〔73〕Assignee: Zoomar Corp, Irvine, Calif.

〔21〕Appl. No: 114,608

〔22〕Filed: Jan. 23, 1980

〔51〕Int. Cl^3. …… H01S 3/03

〔52〕U. S. Cl……331/94.5 D; 331/94.5 C

〔58〕Field of Seach……331/94.5 D, 94.5G, 331/94.5C

〔56〕 References Cited

U. S. PATENT DOCUMENTS

3,916,337 10/1975 Kindl et al.....331/94.5 D

Primary Examiner—William L. Sikes

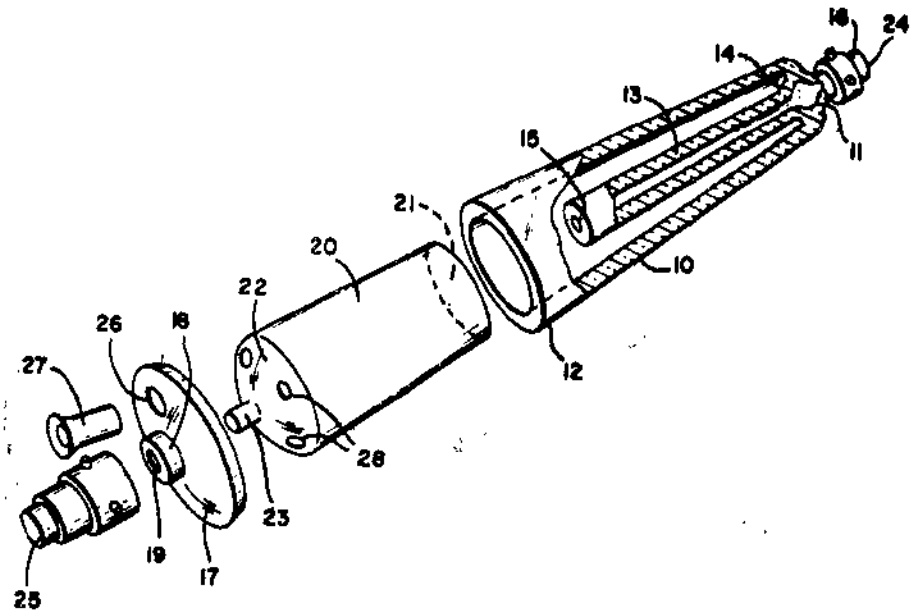
Assistant Examiner—Leon Scott, Jr

Attorney, Agent, or Firm—Ralph B. Pastoriza

〔57〕 ABSTRACT

Maximum capillary discharge (bore) length within the distance available between the end mirrors in a gas laser assembly to thereby obtain maximum activegain length for the laser, is accomplished by utilizing a closed ended aluminum cathode in the glass envelope assembly. The cathode is arranged to shield a nickel-iron alloy. end plate for the envelope and is attached directly to this end plate to effect both electrical contact by way of the end plate and at the same time be properly mechanically supported. The shape of the closed end of the cathode is further designed to provide for a more uniform current density distribution when the laser is operating. Further, small openings may be provided to admit ions into the area adjacent to the discharge capillary tubethereby facilitating initial breakdown of the gases in the laser when starting the laser.

9 Claims, 4 Drawing Figures



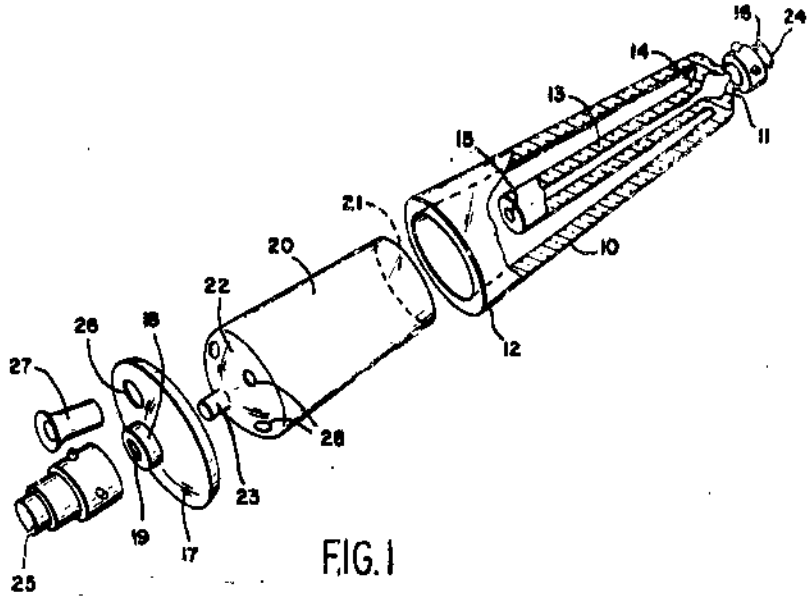


FIG. 1

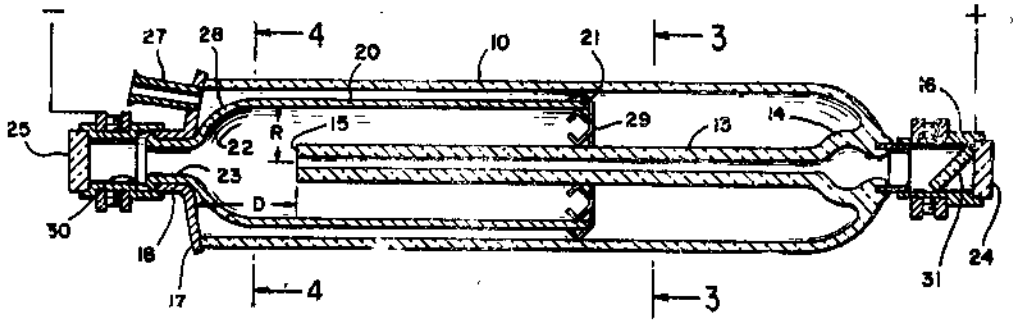


FIG. 2

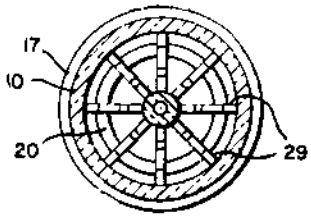


FIG 3

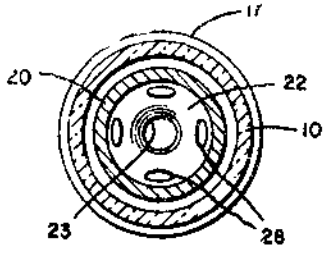


FIG 4

GAS LASER ASSEMBLY

This invention relates generally to gas lasers and more particularly to a gas laser assembly providing improved optical and structural features

BACKGROUND OF THE INVENTION

Most gas laser devices such as helium neon type lasers utilize an aluminum cold cathode. This cathode is usually of cylindrical shape and longitudinally overlaps within a glass envelope the capillary discharge tube. In some of the more recent designs, the aluminum cold cathode has been mounted off a metal end plate closing the cathode end of the surrounding glass envelope. The mounting can be by springs or flexible leads between such end plate and the cathode.

The foregoing type designs place certain restrictions on the dimensioning of the components within the glass envelope. The end plate for the glass envelope at the cathode end of the envelope is generally of a nickel-iron alloy for effecting proper sealing with the glass of the envelope. Further, the coefficients of thermal expansion of this alloy and glass can be made essentially the same so that proper sealing will be maintained over wide temperature variations. On the other hand, the presence of a nickel-iron alloy end plate at the cathode end of the envelope can result in electron emission from the end plate itself because of the proximity of the cathode electrode. Such emission is very undesirable since the nickel-iron alloy has the property of sputtering at very low current densities and thus the useful life of the laser tube is drastically reduced.

The foregoing problem can be solved by physically positioning the aluminum cathode itself sufficiently far from the end plate to insure that little or no electron emission occurs from the end plate surface but that all emission takes place from the inside surface of the aluminum cathode. Such positioning of the cathode, however, prevents full utilization of the space in the envelope body between the end mirrors defining the resonant cavity. As a consequence, maximum active gain length is not utilized.

BRIEF DESCRIPTION OF THE PRESENT INVENTION

With the foregoing considerations in mind, the present invention contemplates a greatly improved gas laser assembly wherein the aluminum cold cathode and other components are so designed as to realize maximum active gain length or maximum capillary discharge (bore) length within the distance available between the end mirror. A more efficient gas laser thus results.

Essentially, the invention includes means for providing a closed volume such as an elongated enclosing envelope having anode and cathode end portions together with an elongated capillary discharge tube in the envelope having a first end portion positioned at the anode end portion of the envelope and an extending second end terminating in an opening short of the far end of the cathodeend portion of the envelope. An anode electrode is supplied at the anode end of the envelope in communication with the first end of the capillary discharge tube. A nickel-iron alloy end plate is provided for closing off the cathode end portion of the envelope and this plate is designed with a central axially evtending neck section defining a central opening. A cylindrically shaped aluminum cold cathode is provided opening out at a first end and having a shapedstructure closing off a major portion of its second end This shaped structure has an extending cylindrical snout receivable within the central opening of the end plate neck section so that the cathode is positioned and supported in the envelope by the end plate. The construction also provides for a reliable electrical connection betweed the cathode and end plate. The cathode coaxially receives in its first open end the capillary tube, the second open end of the capillary tube being axially spaced from the interior of the shaped end of the cathode by a given distance at least as great as the radial distance between the open end and the inner cylindrical wall of the cathode to thereby protect the end plate from the discharge action at this second open end of the capillary tube. Thus, the shaped structure closing off the end of the cathode serves to shield the end plate so that the one end of the cathode can be disposed essentially against this end plate and thereby permit maximum length for the capillary tube without risking current emission from the end plate itself.

The assembly is completed by appropriate end mirrors on opposite ends of the envelope normal to the axis of the capillary tube to define an optical cavity for the laser.

BRIEF DESCRIPTION OF THE DRAWINGS

A better understanding of this invention as well as further features and advantages thereof will be had by now referring to the accompanying drawings in which:

FIG. 1 is an exploded perspective view of the basic components making up the gas laser assembly of this invention;

FIG. 2 is a longitudinal cross section of the various components of FIG 1 after they have been assembled together;

FIG. 3 is a transverse cross section looking in the direction of the arrow 3—3 of FIG. 2; and

FIG. 4 is another transverse cross section looking in the direction of the arrow 4—4 of FIG. 2.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring first to FIG. 1, the gas tube assembly includes an elongated enclosing envelope 10 having anode and cathode end portions 11 and 12. An elongated capillary discharge tube 13, in turn, is provided in the envelope and has a first end 14 which in the embodiment disclosed constitutes an integral portion of the anode end of the envelope 10. The second end of the capillary discharge tube 13 terminates in an opening 15 short of the far end 12 of the cathode end portion of the envelope 10 as shown. An anode electrode 16 is provided at the first anode end portion of the envelope 10, this anode being in communication with the first end portion 14 of the capillary discharge tube 13.

The second end 12 of the elongated envelope 10 is arranged to be closed off by an end plate illustrated at 17. In accord with a feature of this invention, end plate 17 includes an axially extending neck section 18 defining a central opening 19.

Cooperating with the end plate 17 is a cylindrically shaped cold catho-

de 20 made of aluminum opening out at a first end 21 and having a shaped structure 22 closing off a major portion of its second end. The shaped structure 22 is preferably dome shaped and includes an extending cylindrical snout 23. Snout 23 is arranged to be coaxially received within the central opening 19 of the neck section 18 on end plate 17 when the same are assembled.

The major components of the gas laser shown in FIG. 1 are completed by the provision of end mirrors 24 and 25 normal to the axis of the capillary discharge tube 13 serving to define an optical resonant cavity for the laser. In the particular embodiment illustrated in FIG. 1, exhausting of air from the assembled components is accomplished through an appropriate exhaust port 26 and exhaust tube 27 in the end plate 17, although exhausting of the air could take place elsewhere.

In the preferred embodiment of the invention as illustrated in FIG. 1, the dome shaped structure 22 defining the closed second end portion of the cathode 20 is provided with a plurality of small openings 28 for permitting ions to drift into this end portion of the cathode adjacent to the opening 15 of the capillary discharge tube 13 when the parts are assembled.

Referring now to FIG. 2, the assembled relationship of the components described in FIG. 1 will be evident. The coaxial relationship of the snout 23 for the cathode 20 within the extended neck portion 18 of the end plate 17 will be clear. Further, it will be noted that the capillary discharge tube 13 is further supported intermediate its ends by an appropriate spider structure 29 engaging the first end portion 21 of the cathode 20, the interior wall of the envelope 10 and the exterior portion of the discharge tube where it enters the first end opening 21 of the cathode. These engagements by the spider support the discharge tube and the cathode in coaxial relationship with each other and with the axis of the cylindrical envelope 10.

The spider 29 cooperates with the nesting of the snout 23 in the neck section 18 of the end plate in supporting the cathode 20. In this respect, and in the specific embodiment disclosed, the axial length of the snout 23 is greater than the axial length of the opening 19 in the neck section 18 so that the end of the snout can be peenee over the neck seetion as at 30 to provide for a more reliable axial supporting of the second end of the cathode as well as providing for a reliable electrical connection of the cathode to the end plate.

In the particular embodiment shown in FIG. 2, there is provided a Br-

ewster window in the anode end of the envelope as shown at 31.

Referring back to the cathode end of the envelope, it will be evident that the preferred dome shaped structure is essentially hemispherical with a center corresponding approximately to the position of the second end 15 of the capillary discharge tube 13. The arrangement is such that interior parts of the structure closing the end of the cathode are at approximately equal radial distances from the end 15 to thereby provide for a substantially uniform current density on the surface of the cathode. Further, it will be noted that the second open end 15 of the capillary tube is axially spaced from the interior of the end plate 17 by a distance D at least as great as the radial distance R between the open end 15 and the inner cylindrical wall of the cathode 20. This dimensioning essentially assures that the end plate is protected from discharge action at the second open end of the discharge supporting tube.

With respect to the foregoing, it will be recalled that any electron emission from the end plate is undesirable as sputtering can result and the overall life of the laser tube be greatly shortened. The provision of the closed end portion for the cathode serves as a shield for this end plate and moreover, the provision of the snout on the cathode extending into the opening in the end plate and actually peening about the periphery of this opening at the exit end provides further protection.

FIG 3 illustrates the spider structure 29 in better detail wherein there are provided a plurality of radial arms with finger portions for holding the open end of the cathode and the exterior portion of the capillary discharge tube in proper coaxial relationship relative to the interior cylindrical wall of the envelope 10.

FIG. 4 illustrates the various openings 28 wherein four such openings are provided in the shaped end portion 22 of the cathode. The provision of the plurality of small holes 28 is to provide in the use of the use of the teachings of U. S. Pat. No. 3,792,372, a short path for ions to drift into the area adjacent to the discharge open end 15 of the capillary discharge tube 13. Thus, it is easier to start the laser with these ions present as it reduces the required voirage to effect a reliable breakdown. In the absence of the plurality of openings 28, ions would have to traverse into the open end 21 of the cathode passed the spider 29 to reach the vicinity of the opening 15 in the capillary discharge tube and this longer path would greatly reduce the number of ions reaching the desired region. Starting would