In FIG. 5, the gripping ends of the jaw members are matching non-circular structures relative to the open-ended cross-section that they form.

In FIG. 6, the gripping ends of the jaw members are non-matching semi-circular arcs which close in an overlapping configuration relative to the open-ended cross-section that they form.

In FIG. 7, the gripping ends of the jaw members are inverted matching structures which close in an overlapping teeth paraboloid configuration relative to the open-ended cross-section that they form.

A present invention cannula and clamp device can be fabricated with either metal and/or plastic structural components. The device is designed for easy disassembly to facilitate cleaning and sterilizing. In another embodiment, low cost disposable cannula and clamp devices are contemplated, e.g., surgical devices produced with inexpensive molded plastic or cellulosic components.

A further embodiment of the present invention relative to operative cholangiography is the use of radiolucent components in the construction of the cannula and clamp device. Illustrative of radiolucent materials are plastics such as polypropylene, polycarbonate, fiber-reinforced polyethylene or polystyrene, and the like.

The radiolucent construction of the major clamp components prevents interference with the cholangiographic x-ray identification of unsuspected biliary calculi or strictures.

The cannula component need not be radiolucent, and can be in the form of a smooth blunt tip metal tube (either closed or open-ended) which is suitably perforated near the blunt injection tip. The outside diameter of the cannula tube usually will be about 1.5–2.0 millimeters.

The liquid-discharge perforations preferably are located along the barrel of the cannula as well as at the tip. This type of structure minimizes clogging of the perforations during insertion of the cannula tip into a cystic duct stump, and avoids a jet stream effect which tends to back-pressure the cannula out of the cystic duct stump.

The elongated cannula body preferably is longitudinally rigid and laterally flexible. The lateral flexibility permits the injection end of the cannula to be deflected and manipulated in order to accommodate a thick-walled cystic duct stump. The cannula can be constructed of steel, or of a plastic such as polypropylene or high density polyethylene which are readily shaped into semi-rigid conduits.

The feed end of the cannula is attached to a flexible plastic tubing through which a fluid contrast medium is supplied under mild hydrostatic pressure. Illustrative of a contrast media are 25% Hypaque solution (Winthrop Laboratories), Conroy 30% diluted (Diagnostic Products) and Reno-M-60 (Squibb and Sons). Before insertion of the injection end of the cannula into a cystic duct stump, or into a small incision in a cystic duct, the cannula and attached feed system is rinsed and liquid-filled to exclude bubbles.

In FIG. 1, a cannula-clamp device **10** for operative cholangiography is illustrated which is constructed of molded plastic components, with the exception that the cannula and coil spring are composed of metal. The injection end of the perforated cannula is centered in the annular cross-section and extends beyond the gripping ends of the jaw members. The extended shaft of the movable second jaw member is shorter than that of the first jaw member. The curbed configuration of the cannula-clamp device facilitates palming for one-handed manipulation.

Cannula-clamp device **10** as represented has a first jaw member **11**, which has a gripping end **12** and an extended shaft **13**.

The second jaw member **15** has a gripping end **16** and an extended shaft **17**. Second jaw member **15** is movably connected between a pair of support arms **18** extending vertically from shaft **13**, and second jaw member **15** can be movably rotated in a short arc clockwise and counterclockwise about pivot point **19** to open and close gripping ends **12** and **16** of the first and second jaw members.

Coil spring **20** maintains the jaw members in a closed position, until hand-pressure is applied to the extended shafts **13** and **17** to counteract the coil spring **20** bias. As noted previously an elastic band can be employed as the bias means, located between the gripping ends and the pivot point of the two jaw members.

Cannula tube **25** is supportedly integrated with first jaw member **11** at position **26**. The injection end **27** of cannula tube **25** has perforations **28** for emission of a dye solution under hydrostatic pressure. The feed end **29** of cannula tube **25** is attached to a flexible tubing **30**, which in turn is connected to a dye solution reservoir, e.g., a large capacity syringe:

Various cannula and clamp prototype designs within the scope of the present invention have been employed with excellent results in a series of over 80 biliary operations. The cannula and clamp device was incorporated in an assembly of tubing, 4-way stopcock, and two syringes for supply of saline and dye solutions, respectively.

What is claimed is:

1. A cannula and clamp device adapted for operative cystic duct cholangiography comprising (1) a first jaw member with an extended shaft; (2) a second jaw member with an extended shaft which is coextensive and movably connected to said first jaw member wherein the gripping ends of the jaw members in contacting proximity form an annular open-ended cross-section; (3) biasing means for urging said jaw members into contacting proximity; and (4) a cannula which is attached to and inwardy supported by the first jaw member, wherein the injection end of the cannula is rigidly positioned and centered in the annular cross-section formed by the gripping ends of the jaw members, and the feed end of the cannula extends rearwardly and outwardly from the first jaw member; and wherein the jaw members and the extended shafts are angled in a coextensive non-linear configuration.

2. A device in accordance with claim **1** wherein the jaw members and extended shafts are constructed of radiolucent material.

3. A device in accordance with claim **1** wherein the biasing means is a coil spring.

4. A device in accordance with claim **1** wherein the biasing means is an elastomeric spring or band.

5. A device in accordance with claim **1** wherein the biasing means is a screw-adjustable connection between the said jaw members.

6. A device in accordance with claim **1** wherein the annular open-ended cross-section formed by the gripping ends of the jaw members in contacting proximity is circular.

7. A device in accordance with claim **1** wherein the gripping ends of the jaw members are matching incom-