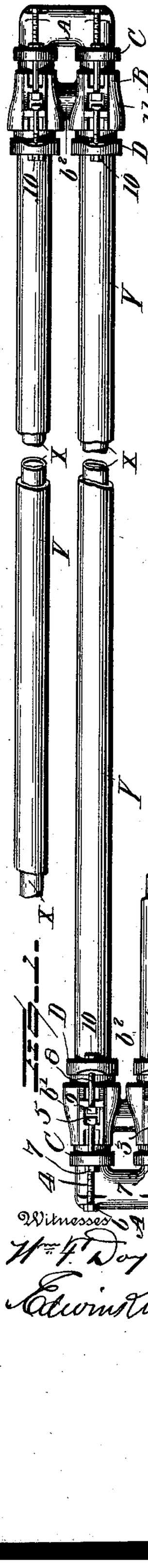
No. 670,362. Patented Mar. 19, 1901.

T. SHIPLEY.

CONDENSING OR COOLING COIL FOR REFRIGERATING MACHINES.

(Application filed Jan. 26, 1901.)

(No Model.) 2 Sheets—Sheet 1.



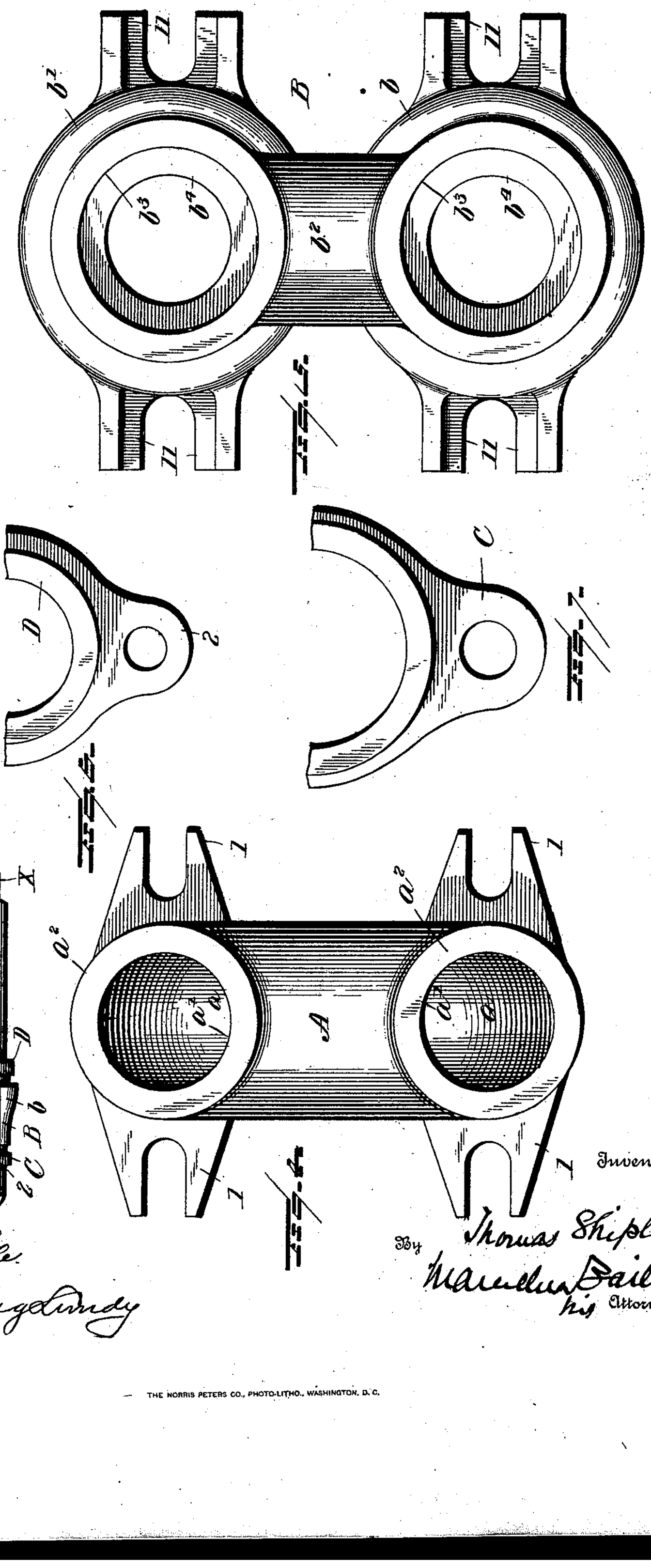


FIG. 5.

FIG. 6.

FIG. 7.

FIG. 4.

FIG. 3.

Inventor

By Thomas Shipley

Marcellus Bailey

his Attorney

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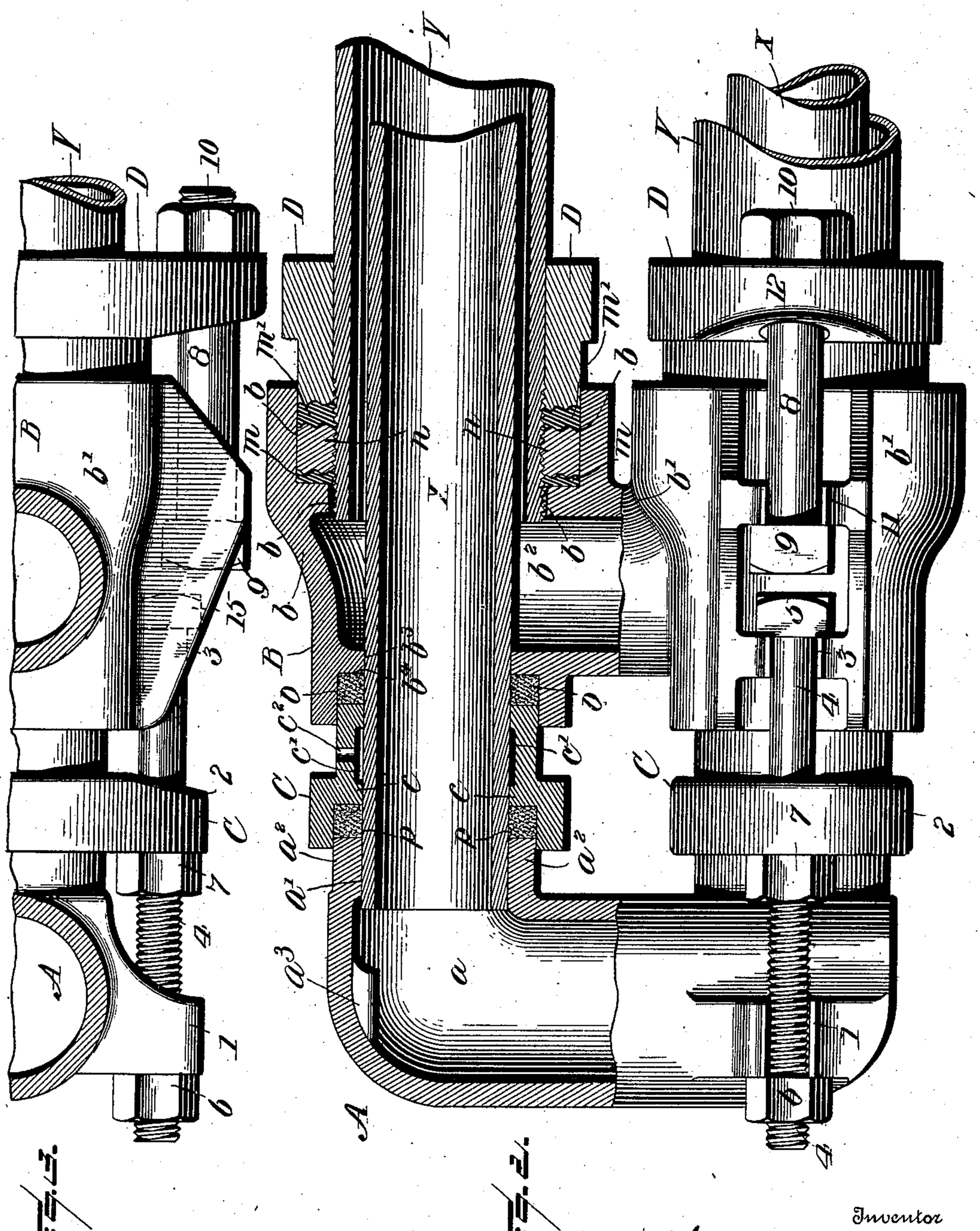

Witnesses
W. F. Doyle.
Edwin Knight Lindsay

Inventor
Thomas Shipley
By Wallace Bailey
his Attorney

UNITED STATES PATENT OFFICE.

THOMAS SHIPLEY, OF YORK, PENNSYLVANIA.

CONDENSING OR COOLING COIL FOR REFRIGERATING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 670,362, dated March 19, 1901.

Application filed January 26, 1901. Serial No. 44,915. (No model.)

To all whom it may concern:

Be it known that I, THOMAS SHIPLEY, a citizen of the United States, and a resident of York, in the county of York and State of Pennsylvania, have invented certain new and useful Improvements in Condensing or Cooling Coils for Refrigerating-Machines, of which the following is a specification.

My invention has relation to condensing or cooling coils for ice-making or refrigerating coils, and it has more particular relation to the "double-pipe" system—that is to say, a system in which one continuous coil of pipe is inclosed within another continuous and larger coil of pipe, water passing through one coil and the refrigerant gas or liquid, such as ammonia, passing through the other. In coils of this character it is usual at present for the ammonia to pass through the outer pipe and the water to pass through the inner pipe. Such a coil is shown, for example, in the Campbell and Westerlin Patent No. 635,955, of October 31, 1899, which shows in Figure 1 of the drawings a double pipe-coil in which the sections of the outer coil are connected alternately at opposite ends and at a point between the two ends, and in Fig. 7 of the drawings a like coil, in which the sections of the outer coil are connected alternately at opposite ends only and the return-bends of the inner pipe coil in either case being exposed and removable.

My invention has especially to do with the end return-bends of the two pipe-coils; and it consists of a double return-bend whose distinctive features will first be described in connection with the drawings accompanying and forming part of this specification and will then be more particularly pointed out in the claims.

In said drawings, Fig. 1 is a side elevation of a portion of two connected bends of a double coil. Fig. 2 is an enlarged view of my improved double bend, the lower half of it being in side elevation and the upper half of it being in longitudinal axial section. Fig. 3 is a plan of one longitudinal half of the double bend. Fig. 4 is an inner end elevation of the bend for the inner pipe of the coil. Fig. 5 is a like elevation of the opposed end of the bend for the outer pipe of the coil. Fig. 6 is a plan of one-half of the gland which is interposed between the two bends, and Fig. 7 is a plan of one-half of the gland which closes the other mouth or end of the bend shown in Fig. 5.

In the drawings, X represents the straight pipe-sections of the inner coil, Y represents the straight pipe-sections of the outer coil, and A B C D are the main parts of the double bend, by which the appropriate ends of these sections in succeeding folds of the double coil are connected to each other. A is the bend for the inner pipe-sections X. B is the bend for the outer pipe-sections Y. C is the gland interposed between the interior opposite faces or ends of the two bends D is the gland which is applied to the other and inner end of the bend B.

The bend B is formed at its inner end with two circular openings b to receive the ends of the pipe-sections Y to be connected, each of which openings is surrounded by a bell-mouth b' to receive the packing m m' and gland D, by which the opening is sealed, as well as the ring n, which is screwed upon the externally-screw-threaded end section Y, and forms a shoulder which brings up against the bottom of the bell-mouth when the parts are drawn together. I have shown packing on both sides of the ring n, but in practice only that, m, between the gland D and the ring need be used, and the other, m', can be dispensed with. The bend B has an internal passage-way b^2, through which the open ends of the two sections Y Y communicate with each other.

The sections X of the inner coil extend through the sections Y of the outer coil and are of less diameter than the latter, so as to leave between the two an annular passage, as shown. The ends of sections X extend outwardly some distance beyond the ends of the outer sections Y and protrude through openings b^3, formed in the outer face or end of the bend B and of a size to snugly fit the said ends of the inner coil-sections, each of said openings being surrounded by a bell-mouth b^4 to receive packing o and one end of the gland C. The ends of sections X are

long enough to protrude outwardly through and beyond glands C, and these protruding ends enter openings a' in the bend A, each of these openings being surrounded by an annular flange a^2 to enter a corresponding bell-mouth c on the contiguous end of its gland C and to compress the packing p therein. A passage-way a in the interior of bend A connects the openings a'.

When the parts thus far described are brought tightly together, the ends of the pipe-sections X and Y are tightly packed in their respective bends, while at the same time separate and distinct passage-ways are provided through which the pairs of sections X and Y, respectively, are in communication. In thus drawing and holding together the parts of the double bend it is desirable that the outer bend shall be removable to expose the ends of the sections X without disturbing or loosening any of the other parts of the double bend. Various devices can be made use of for this purpose. One simple means is illustrated in the drawings. The outer bend A, the intermediate gland C, and the inner bend B are each provided on each side with an ear, (marked 1 2 3, respectively.) Ears 1 and 3 are of yoke form, and the other ear, 2, is perforated, this being for the free passage of a long screw-threaded bolt 4. The head 5 of the bolt is held in the jaws of the yoke 3, and the bolt thence passes outwardly through the ears 2 and 1. On the screw-threaded portion of the bolt are two nuts 6 7, the latter serving to press the gland C toward the bend B, and the former serving to press the bend A toward the gland C. Under this arrangement it will be noted that by loosening and unscrewing the nuts 6 from the bolts 4 the outer bend A can be removed without disturbing the other parts. The inner bend B and its gland D are held together by bolts 8, which engage ears 11 12 on said bend and gland, respectively. The ear 11 is of yoke form and the ear 12 is perforated for the free passage of the bolt, the head 9 of the bolt engages the jaws of the yoke-ear 11, and a nut 10 on the screw-threaded end of the bolt draws together the two parts B and D.

In lieu of using two bolts on a side manifestly one long screw-threaded bolt could be used to pass through the ears 11 12 and 1 2, (ear 3 in this case might be dispensed with,) ears 1 2 being extended laterally, so as to be in alinement with ears 11 and 12 and a collar being fixed on the bolt where the head 9 now is. It is also manifest that the intermediate gland C can be made bell-mouthed at both ends or the bends proper can be made bell-mouthed and the gland made straight and without a bell-mouth.

It will be noted that in the gland C, at a point between the two packing-rings o and p, there is an annular space or recess c' around each pipe-section, which by an aperture c^2 in the gland communicates with the outside air. Ammonia usually travels in the outer section Y and the inner bend B, and should there be any leaks in the packing o the ammonia will escape through the hole or holes c^2 and will thus be detected. If this provision were not made and the gland were solid, the ammonia could without detection escape through the packing into the space a in the outer bend A, and thus impregnate the water which circulates in that bend and the sections X which said bend connects.

One advantage of the double bend thus made is that little or no machine-work is required in making it. The only piece that need be "machined" is the ring n, which is tapped. The remaining parts are castings which may merely be ground.

A further advantage is that with a double bend of the kind described the inner pipe X requires no screw-threading whatever. This is of decided advantage in the manufacture of the apparatus, besides which the arrangement is such as to permit the inner pipe to be readily slipped out whenever it becomes necessary to cleanse or renew it.

A stop a^3 on the interior of the outer bend A prevents any undue endwise creeping or slipping of the inner pipe.

Having described my invention and the best way now known to me for carrying the same into practical effect, I state in conclusion that I do not limit myself narrowly to the structural details herein described and illustrated, for the same manifestly can be varied to some extent without departure from the invention; but—

What I claim herein as new, and desire to secure by Letters Patent, is as follows:

1. In a double cooling or condensing coil for refrigerating-machines, the combination with the ends of the outer coil-sections, and the ends of the inner coil-sections, of an inner bend B connecting the ends of the two sections of the outer coil; an outer bend A connecting the ends of the two sections of the inner coil; glands C interposed between and common to both bends; means for drawing and detachably holding said bends upon the opposite ends of said glands; and glands D and means for holding the same to the inner end of said inner section B, substantially as and for the purposes hereinbefore set forth.

2. In a double cooling or condensing coil for refrigerating-machines the combination of the ends of the outer coil-sections; an inner bend B connecting said ends; the ends of the inner coil-sections passing through and protruding beyond said bend B; an outer bend A connecting said ends of the inner coil-sections; glands C, interposed between and engaging both of said bends; and means for drawing and detachably holding said bends upon opposite ends of said glands, substantially as and for the purposes hereinbefore set forth.

3. The combination with the pipe-sections

of the inner and outer coils, and bends A, B, connecting said several sets of sections respectively, of the glands C, interposed between and engaging said bends, and provided each with a recess c' and aperture c^2, substantially as and for the purposes hereinbefore set forth.

In testimony whereof I have hereunto set my hand this 17th day of January, 1901.

THOMAS SHIPLEY.

Witnesses:
A. B. STESCHLER,
B. E. LOUCKS.