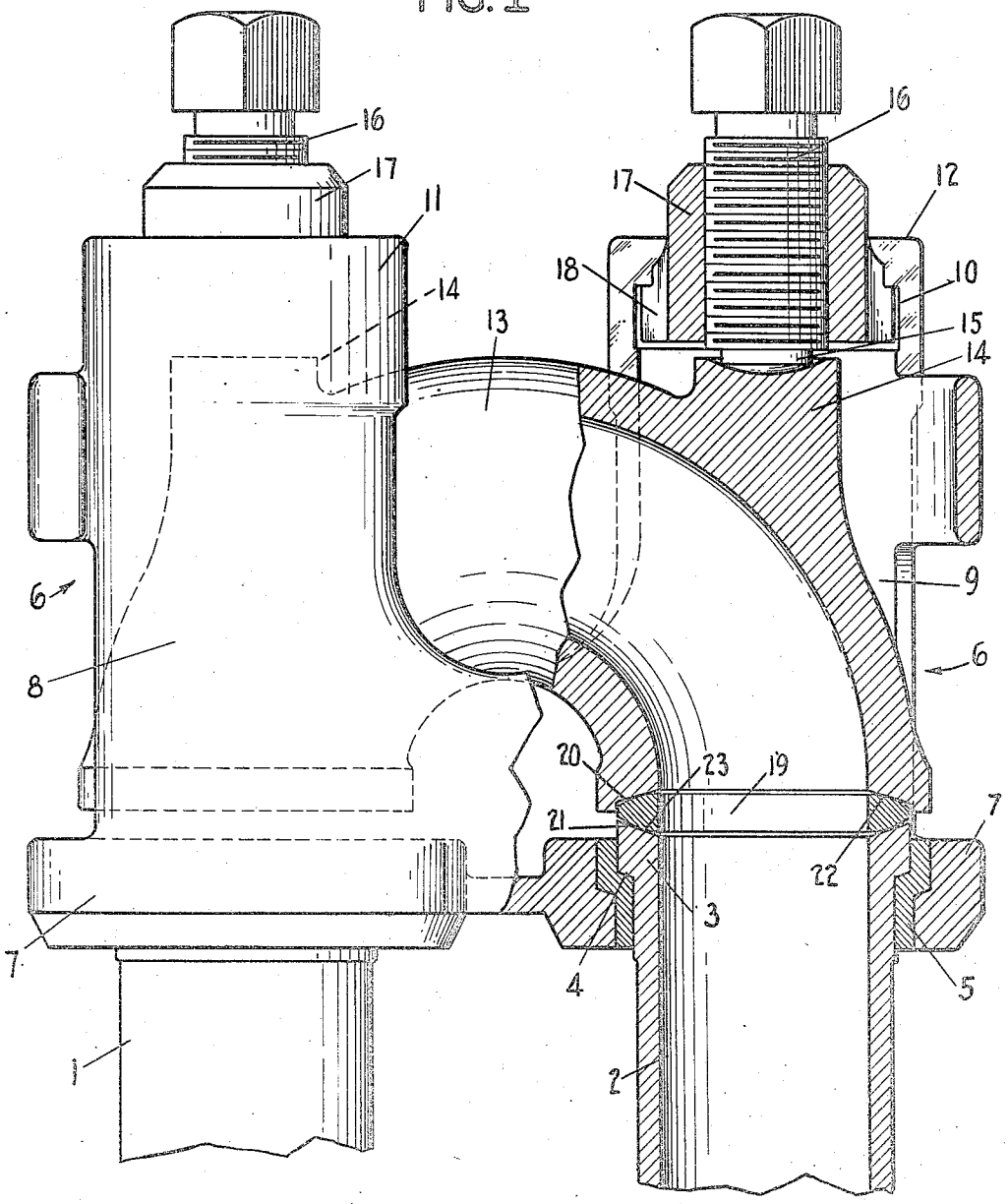
July 12, 1932. F. C. FANTZ 1,866,636

RETURN BEND

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FIG. 1



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FIG. 2

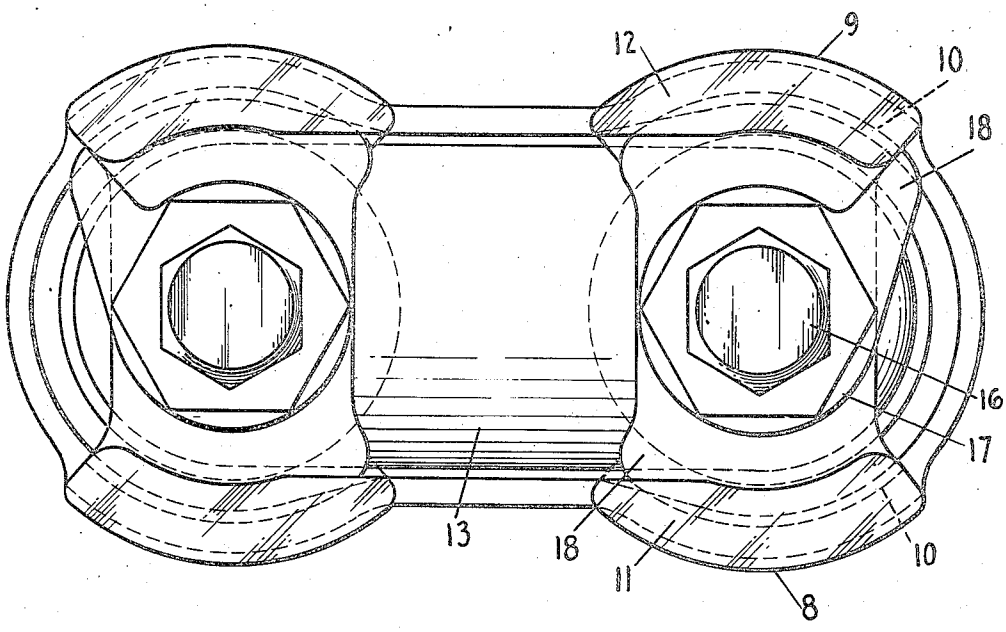


FIG. 3

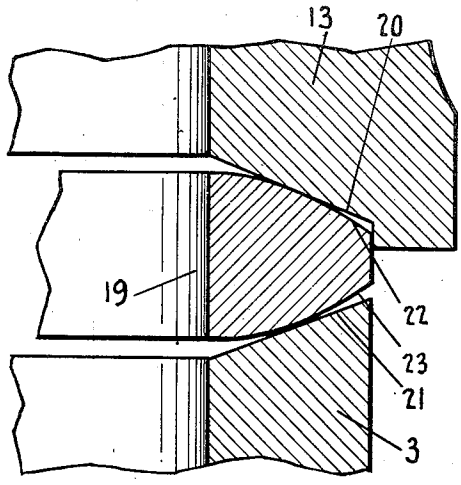
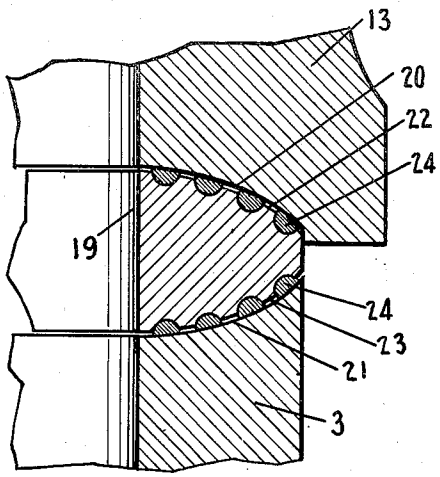


FIG. 4



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UNITED STATES PATENT OFFICE

FRED C. FANTZ, OF WEBSTER GROVES, MISSOURI

RETURN BEND

Application filed November 7, 1929. Serial No. 405,295.

My invention relates to that class of return bends described in my copending application, Serial No. 352,780, filed April 5, 1929, now Patent No. 1,752,331 in which I have shown a return bend for cracking stills, which is designed to resist the high pressure and temperature to which devices of this kind are subjected.

As illustrated in that case, I show a pair of tubes which are fitted to annular grooves formed in the face of the return bend proper.

My present invention is designed as an improvement on the method of forming these joints. These joints have to be susceptible of sustaining extremely high pressure, and consequently have to be very accurate.

My present invention has for its object, to provide a type of joint which can easily be separated when it is necessary to remove or clean a tube.

My means for accomplishing the foregoing object may be more readily understood by reference to the accompanying drawings, which is hereto annexed and is a part of this specification, in which—

Fig. 1 is a side elevation, part of the exterior wall being broken away, showing a vertical sectional view of one of the tubes and a portion of the return bend and clamping device;

Fig. 2 is a top or plan view of the device shown in Fig. 1;

Fig. 3 is an enlarged fragmentary detail view of a portion of the ring; and

Fig. 4 is a similar view, showing a modified form of the ring.

Similar reference numerals refer to similar parts throughout the entire description.

In the drawings I show only a fragmentary portion of tubes 1 and 2, as obviously these form no part of my invention; and I shall describe only the joint for tube 2, it being understood that an identical joint will be employed for tube 1.

As shown in the drawings, the end 3 of tube 2 is expanded outwardly, to form a shoulder 4. An annular metal bushing 5, which is formed in sections to facilitate its positioning, is mounted intermediate the outside of the tube 2 and the inside of an annular portion 7 formed on a yoke 6, and engages the shoulder 4, there being two such annular portions 7 on the yoke 6. The yoke 6 may be formed in a single piece as shown, or it may be formed in two pieces if desired, as shown in Figs. 5 to 7 in my application hereinbefore mentioned.

Each annular portion 7 of the yoke 6 has upwardly-extending segmental side walls 8 and 9. Slots 10 are formed in the inner surface of these side walls 8 and 9, adjacent their upper ends 11 and 12.

A return bend 13 has cast or formed on its exterior wall two abutments 14, each of which is adapted to be engaged by the end 15 of a set screw 16, which is mounted in a movable plate 17. This plate 17 is provided with two radially-extending arms 18, which are fitted to the slots 10 in the segmental side walls 8 and 9 of each annular portion 7 formed on the yoke 6. It is obvious there are two movable plates 17, one for each tube, and two set screws 16.

As illustrated, the face 20 of the return bend 13 is machined on an inwardly extending taper. The end face 21 of each of the tubes is also machined with an inwardly extending taper. Intermediate these tapered faces 20 and 21 I mount a ring 19, faces 22 and 23 of which are formed convex. As clearly seen in Fig. 3, the contact between the abutting faces 20 and 22, and 21 and 23, is at a single point only, and as a consequence it is comparatively easy to separate the joint in case it becomes necessary to change a tube or tubes, to clean them, or to adjust one that has becomes bowed.

In assembling the device, tubes 1 and 2 are placed in the nest or bank; the annular portions 7 of the yoke 6 are passed over the ends 3 of the tubes 1 and 2; the sections of the metal bushing 5 are then placed intermediate the tubes 1 and 2 and the shoulders 4 on the annular portions 7 of the yoke 6; the return bend 13 is then placed intermediate the segmental side walls 8 and 9 formed on the annular portions 7 of the yoke 6, with the faces 20 of said return bend 13 engaging the ring 19 mounted intermediate said faces 20 and the faces 21 of the pipes or tubes 1 and 2;

the movable plates 17 are then placed so that their arms 18 extend into the spaces between the segmental side walls 8 and 9. Then, by adjusting the movable plates 17 so that their arms 18 register with the slots 10 in the side walls 8 and 9, and tightening the set screws 16, it is obvious the annular members 7 on the yoke 6 will be drawn upwardly, and in turn the bushings 5 will be caused to tightly engage the shoulders 4 on the ends 3 of the tubes 1 and 2. At the same time, as clearly seen from the drawings, this will press the faces 20 of the return bend 13 down tightly against the faces 22 of the rings 19, and will press the faces 23 of the rings 19 tightly against the faces 21 of tubes 1 and 2, thereby forming a perfectly tight joint.

It will be apparent, from the foregoing description, that when the return bend 13 is removed, there is no risk whatever of the joint being injured in any way, as all that is necessary is to insert new rings 19, when a perfectly tight joint is insured.

In the modified form of construction shown in Fig. 4, I form a plurality of concentric grooves in the faces 22 and 23 of the rings 19. These grooves 24 are filled with some suitable alloy, softer than the material of which the rings 19 are formed. Where this construction is employed, I have found it desirable to form the faces 20 on the return bend 13, and the faces 21 on the tubes 1 and 2, concave, to fit the faces 22 and 23 on the rings 19. The modified form is assembled in the manner before described, and when the set screws 16 are tightened the joint is tightly sealed by the compression of the softer alloy in the grooves 24 in the faces 22 and 23 of the rings 19.

Having described my invention, what I regard as new, and desire to secure by Letters Patent of the United States, is:

In a refinery apparatus, a return bend, a housing therefor, a pair of tubes communicating with said bend loosely mounted in said housing, means detachably mounted in said housing adapted to cause said housing and tubes to interlock, each face of said return bend being formed with an inwardly extending taper, there being a corresponding inwardly extending taper on the end of each of said tubes, bushings intermediate said taper portions the contacting faces of said bushings being convex, there being a plurality of concentric grooves formed in the faces of said bushings, said grooves being filled with metal softer than that of which said bushings are formed.

FRED C. FANTZ.