

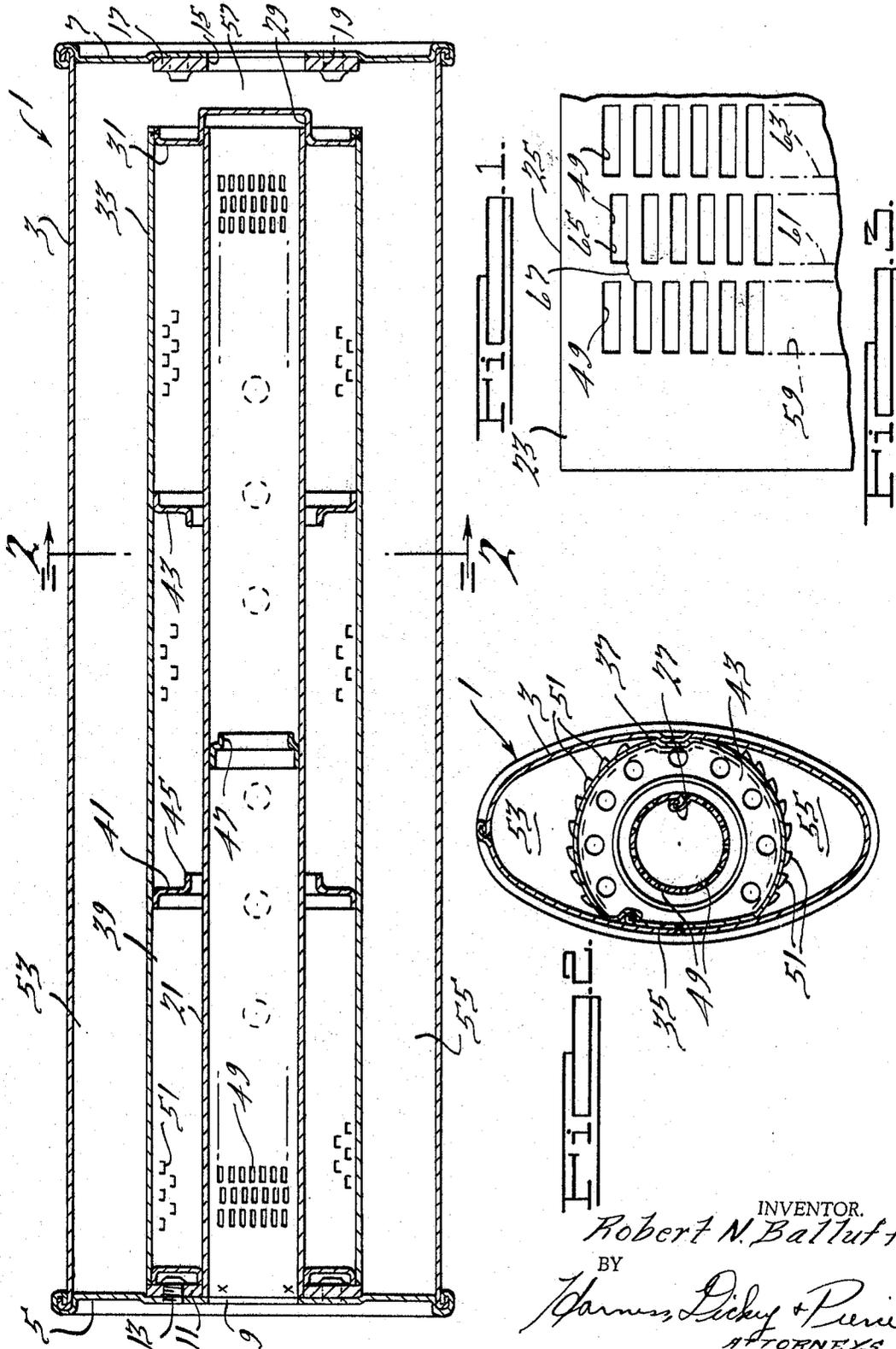
Dec. 23, 1969

R. N. BALLUFF

3,485,319

EXHAUST GAS CONVERTER OR MUFFLER TUBE WITH STAGGERED LOUVERS

Filed Dec. 21, 1967



INVENTOR.  
*Robert N. Balluff*  
BY  
*Harnes, Dickey & Perie*  
ATTORNEYS.

1

2

3,485,319

**EXHAUST GAS CONVERTER OR MUFFLER TUBE WITH STAGGERED LOUVERS**

Robert N. Balluff, Rives Junction, Mich., assignor to Walker Manufacturing Company, Racine, Wis., a corporation of Delaware

Filed Dec. 21, 1967, Ser. No. 692,360

Int. Cl. F02m 35/00; F01n 1/08, 7/18

U.S. Cl. 181—35

1 Claim

**ABSTRACT OF THE DISCLOSURE**

A perforated tube of the type used in automotive exhaust gas converters or mufflers is formed by perforating flat metal stock and rolling it into a tube. The holes are arranged in transverse rows with respect to the tube axis and the holes in each row are uniform and aligned. However, the holes in adjacent rows are staggered and this eliminates or minimizes tearing across the holes during roll-up.

**SUMMARY OF THE INVENTION**

It is the purpose of this invention to provide a hole or louver pattern for a rolled-up tube in which the holes are arranged to avoid fracture during manufacture of the tube.

This is accomplished by staggering the holes in adjacent transverse rows so as to obtain maximum distance between corners of the holes and minimize planes of weakness.

**DESCRIPTION OF THE DRAWINGS**

FIGURE 1 is a longitudinal cross-section through an exhaust gas catalyst converter embodying the invention;

FIGURE 2 is a cross-section taken along the line 2—2 of FIGURE 1; and

FIGURE 3 is an enlarged plan view of a blank partly broken away, which may be rolled up into the center tube of the converter of FIGURE 1.

**DESCRIPTION OF THE INVENTION**

The converter 1 has an outer shell 3 which is preferably oval in cross-section and which has one end closed by an inlet header 5 and the other end closed by an outlet header 7. The inlet header 5 has an inlet opening 9 which is surrounded by a relatively thick pad 11 containing threaded holes 13 whereby a flanged exhaust pipe may be bolted to the converter to deliver exhaust gas to the opening 9. The outlet header has an outlet 15 which is surrounded by a relatively thick metal ring 17 which contains threaded openings 19 for attachment to the flange of a tail pipe for conducting gases away from the converter 1.

Inside of the shell 3 and in alignment with the inlet opening 9 is a perforated gas flow tube 21 which is rolled up from a blank 23, the opposite edges 25 of the blank being interlocked in a lock seam 27. One end of the center tube 21 is located inside of the pad 11 and the other end is supported in a cup-shape recess 29 in an imperforate transverse partition 31 that is secured by spot-welding to the end of a shell 33 that surrounds and is coaxial with the tube 21. Diametrically opposite sides of the shell 33 are in engagement and spot-welded to diametrically opposite sides of the shell 3 as seen at 35 and 37. The annular chamber 39 between the tube 21 and the shell 33 may be subdivided into subchambers by means of transverse partitions 41 and 43 but the inner diameter of these partitions is preferably somewhat larger

than the outer diameter of the tube 21 as seen at 45. Inside of the tube 21 is fixed a restrictor partition 47.

In use the unit 1 is adapted to be a catalyst converter and for this purpose the chamber 39 is filled with suitable catalyst pellets. Gas entering the inlet 9 can flow radially through any of a large number of perforations 49 in the center tube 41 to pass through a catalyst bed which will be formed by the catalyst pellets in the chamber 39. The shell 33 is formed from end to end with a great number of louvers 51 so that gas leaving the catalyst bed can flow into chamber 53 or chamber 55 on opposite sides of the shell 33. The gas from both of these chambers flows to an end chamber 57 and out of the unit through the outlet 15.

As already indicated, tube 21 is formed from a blank 23 which contains rectangular holes 49 in great number extending from end to end of the tube. It is seen in FIGURE 3 the holes 49 are formed in rows 59 and 61, 63, etc. which extend in planes at right angles to the axis of the tube 21. The holes 49 in each row are uniform in size and shape and in alignment with each other and uniformly spaced from one another. Their major dimensions (length) extends parallel to the tube axis. However, the holes in adjacent rows, as row 61 compared with rows 59 and 63, are staggered or off-set by a distance which is preferably 1/2 their width. Thus, the edge 65 of hole 49 in the row 61 is in longitudinal alignment with the mid-plane of the adjacent holes 49 in the rows 59 and 63. The result of this hole arrangement is that stresses associated with rolling of the blank 25 into a tube 21 are absorbed by a greater length of metal along the diagonals 67 between corners of holes in adjacent rows and a substantially fracture-free tube can be produced by rolling up the blank 25.

Modifications may be made in the structure illustrated without departing from the spirit and scope of the invention. While the invention has been disclosed for an exhaust gas converter, it is apparent that it can be used with exhaust gas mufflers or other gas flow treating apparatus. It is evident that the parts described are preferably made of sheet steel or other suitable metal.

I claim:

1. A gas flow conduit for use in an exhaust gas treating assembly or the like comprising a metal tube having a longitudinal seam extending along its entire length and parallel to the axis of the tube, and a plurality of rows of holes in the tube, each row being transverse to the seam and axis of the tube and containing a plurality of substantially identical, substantially rectangular holes, said holes in each row being substantially uniformly spaced from and aligned with each other, adjacent transverse rows of holes being transversely offset so that longitudinally adjacent holes are staggered and the longitudinal edges of holes in one transverse row are aligned with mid-portions of the holes in the adjacent transverse rows.

**References Cited**

**UNITED STATES PATENTS**

2,038,309	4/1936	Oldberg.
2,066,467	1/1937	Gray.
2,182,204	12/1939	Hector.
2,251,369	8/1941	Moss.
2,251,880	8/1941	Cary et al.
2,642,147	6/1953	Dearing.

ROBERT S. WARD, JR., Primary Examiner

U.S. Cl. X.R.

181—54, 61, 63, 72