(No Model.)

H. C. CAMPBELL.

GAS MAIN.

No. 392,406. Patented Nov. 6, 1888.

FIG. 1.

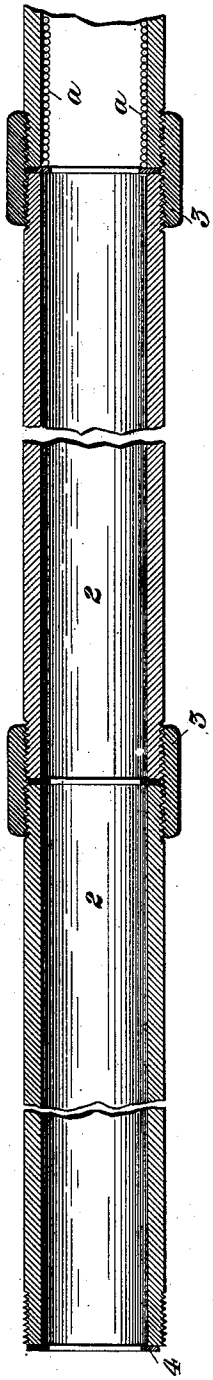
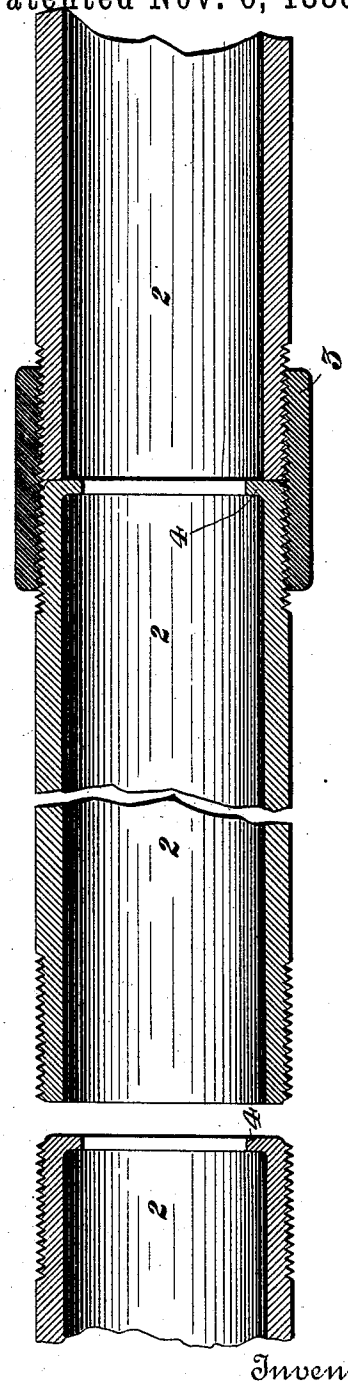


FIG. 2.



Witnesses,
W. B. Corwin
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Inventor,
Harry C. Campbell.
by W. Baxewell & Sons,
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UNITED STATES PATENT OFFICE.

HARRY C. CAMPBELL, OF PITTSBURG, PENNSYLVANIA.

GAS-MAIN.

SPECIFICATION forming part of Letters Patent No. 392,406, dated November 6, 1888.

Application filed February 16, 1888. Serial No. 264,219. (No model.)

To all whom it may concern:

Be it known that I, HARRY C. CAMPBELL, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Gas-Mains; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical axial section of a gas pipe or conduit provided with my improved device. Fig. 2 is a similar view, on a larger scale, illustrating a modification.

Like symbols of reference indicate like parts in each.

In the drawings, 2 2 represent sections of pipe—such as is commonly used in gas-lines—which are placed end to end and coupled by screw-threaded sockets 3, though the mode of their connection does not form part of my invention, and any suitable unions may be employed.

At intervals along the pipe-line the pipe-sections are provided with inwardly-projecting annular shoulders or flanges 4, which in the modification shown in Fig. 1 are constituted by flat rings or washers of less internal diameter than the pipe-sections. These are placed between the abutting ends of the sections 2 and project inwardly, so as to contract the area of the cross-section of the pipe at the points of their location. In Fig. 2 the shoulders 4 are formed by turning in the end of the pipe-sections 2, so that when joined to the next section the lip so made shall project inwardly in like manner as does the annular washer shown in Fig. 1. The shape and arrangement of the flanges may thus be modified in various ways—*e. g.*, they may be cast integrally with the pipe-sections or with the coupling-sleeve; but I have found that the best results are obtainable when they are made to project at right angles from the interior of the pipe.

When the conduit is constructed as I have described, I have found that the gas passes therethrough much more easily and with less friction and loss of velocity than if the interior of the pipes be plain, as is ordinarily the case.

I do not wish to limit myself strictly to any theory of operation of this device, but after a series of experiments I am of opinion that the following is the correct theory: The projecting ridges 4 check the gas which flows through the pipe and form between them a cylindrical eddy or cushion of still gas against the sides of the pipe, the thickness of the sides of which cushion is about equal to the width of the projecting portions of the annular ridges 4. The density of this gas-eddy will of course be substantially the same as that of the flowing gas, and as the latter passes through the pipe it will come in contact only with the adjacent gas cushion and not with the pipe-surface. The swirling rotation of the gas confined by the ridges 4 probably causes it to assume globular forms, as shown at *a*, and these gas-globules, acting as friction-rollers to the gas, will cause it to flow freely and without material loss of velocity for a long distance. The saving in the velocity of gas delivered through such a conduit as compared with the flow through those heretofore in use more than compensates for the diminution in area of the pipe cross-section caused by the presence of the flanges 4. Of course the flanges 4 should not be separated farther than is permitted by their capacity to create and maintain the cylindrical eddies. Their relative situation and their width will be determined by the area of the pipe and the velocity and pressure of the gas conveyed therethrough.

I do not claim, broadly, the method of conveying gas through a conduit, wherein the frictional retardation of the gas-flow is diminished by a series of contractions in diameter of the conduit; but I limit my invention to an improvement in apparatus for practicing this method—viz., annular flanges at the joints projecting inwardly into the conduit—the distinguishing advantage of this improvement being that the flanges accomplish the desired result better than interposed pipe-sections of smaller diameter than the rest of the conduit and other similar constructions, because these reduce the diameter of the pipe without to the desired extent, producing the necessary gas-eddies.

I claim—

As an apparatus for the distribution of gas through a conduit, wherein the frictional retardation of the gas-flow is diminished by a series of contractions in diameter of the conduit, a conduit made of a series of connected pipes having at the joints inwardly-projecting annular flanges, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 11th day of February, A. D. 1888.

HARRY C. CAMPBELL.

Witnesses:
W. B. CORWIN,
JNO. K. SMITH.