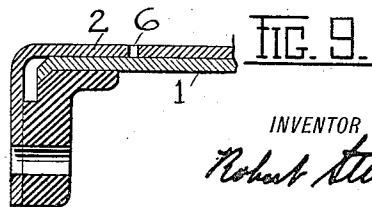
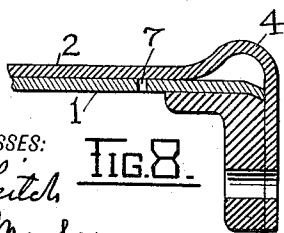
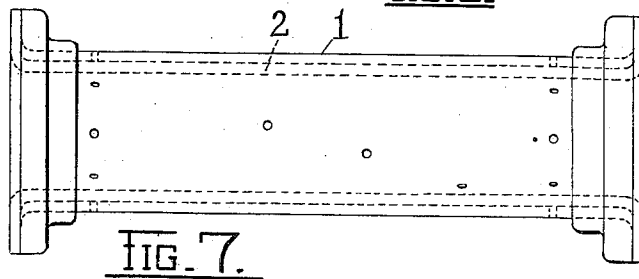
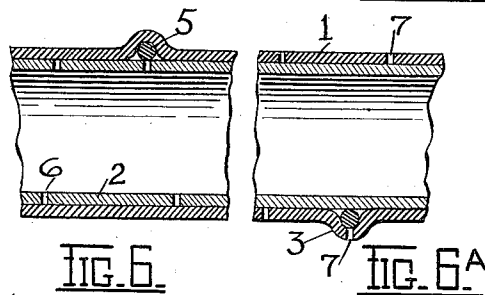
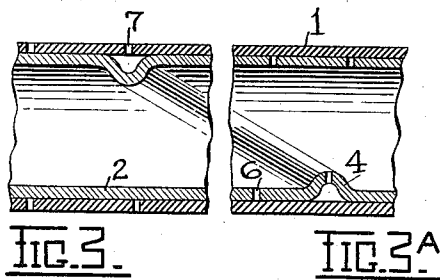
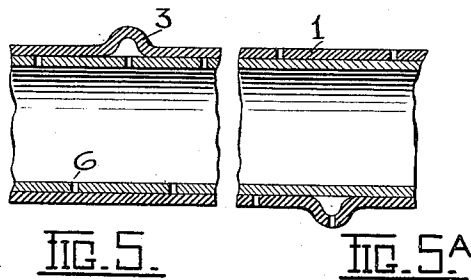
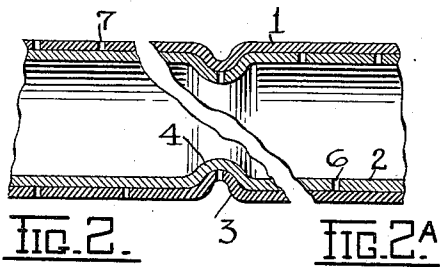
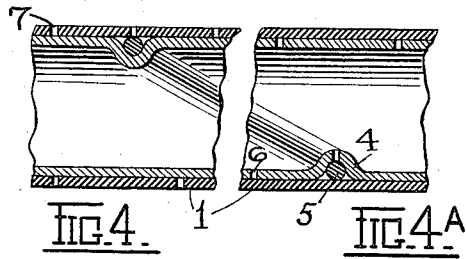
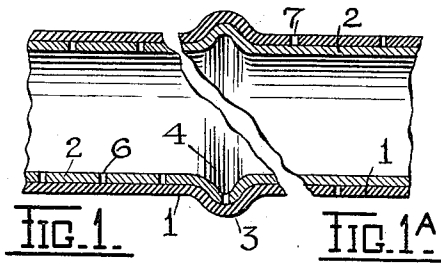


R. STOCKER.
PIPE LINING.
APPLICATION FILED MAR. 12, 1915.

1,153,724.

Patented Sept. 14, 1915.



WITNESSES:
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PIPE-LINING.

1,153,724.

Specification of Letters Patent.

Patented Sept. 14, 1915.

Application filed March 12, 1915. Serial No. 13,974.

(DEDICATED TO THE PUBLIC.)

To all whom it may concern:

Be it known that I, ROBERT STOCKER, a citizen of the United States, residing at Brooklyn, in the county of Kings, in the State of New York, have invented certain new and useful Improvements in Pipe-Lining, and of which the following is a specification.

Under the act of March 3, 1883, the invention herein disclosed may be used by the Government, or any of its officers or employees, and by contractors of naval or other Government vessels, without payment of royalties.

My invention relates to pipe lining, and more particularly to lead lined piping where the finished pipe consists of inner and outer tubing, wherein pressure may be created between the two tubes due to the presence of air, water or other expansive substance, due to variations in temperature, pressure, or other causes.

The objects of the invention are to provide a means for preventing or relieving the said pressure between the two tubes and thus prevent collapse of one of the said tubes. The sought means of relief may be disposed locally or through the entire length of the pipe.

The invention consists, broadly speaking, of suitable perforations in the inner tube, or in the outer tube, or in both tubes. The perforations may consist of drilled holes or produced by any other means or of any shape, size or number, as may best suit the particular installation.

The present ordinary form of plain lead lined piping is experiencing much trouble. In this application I make use of plain lined piping and of corrugations as shown in my former application but overcome the defects, viz., the bulging between the elements due to changes in temperature and variations in pressure which produce bulging and then pulsations of the bulged parts, which ultimately causes fracture, by the introduction of an escape means for the pressure generated by gases, vaporization, or other causes, the said means being in the form of the perforations above referred to.

Before describing my invention in detail I wish it understood that I do not intend to limit myself to any particular method of

perforating the tube elements, nor to any particular size, form, number, or disposition of the perforations. The lead lining or protecting means may be either internal or external with respect to the pipe; in other words, I shall expect to make any such alterations to the forms here shown and described that may be necessary to meet the different requirements of manufacture, or purpose for which used; or, in fact, to make any mechanical changes so long as I do not depart from the broad spirit of the invention as set forth in the annexed claims.

In the drawings forming part of this application Figure 1 is a longitudinal sectional elevation of a pipe showing the circumferential outward corrugation of the outer and inner elements, the said inner element being perforated. Fig. 1^A is a longitudinal sectional elevation of a pipe showing a circumferential outward corrugation of the outer and inner elements, the said outer element being perforated. Fig. 2 is a longitudinal sectional elevation of a pipe showing circumferential inward corrugations of the outer and inner elements, the said outer element being perforated. Fig. 2^A is a longitudinal sectional elevation of a pipe showing circumferential inward corrugations of the outer and inner elements, the said inner element being perforated. Fig. 3 is a longitudinal sectional elevation of a pipe showing a spiral inward corrugation of the inner element, the said outer element being perforated. Fig. 3^A is a sectional elevation of a pipe showing a spiral inward corrugation of the inner element, the said inner element being perforated. Fig. 4 is the same as Fig. 3 with the addition of a supporting means for the corrugations. Fig. 4^A is the same as Fig. 4 except the perforations are disposed in the inner element. Fig. 5 is a longitudinal sectional elevation of a pipe showing a spiral outward corrugation of the outer element, the said inner element being perforated. Fig. 5^A is a longitudinal sectional elevation of a pipe showing a spiral outward corrugation of the outer element, the said outer element being perforated. Fig. 6 is the same as Fig. 5 with the addition of a supporting means for the corrugations. Fig. 6^A is the same as Fig. 6 except the perforations are disposed in the outer

element. Fig. 7 is a longitudinal elevation of a section of a pipe showing lead lining fitted in the ordinary way, that is without corrugations and in which are shown the manner of providing the escape means for fluids or gases that may generate between the elements, in this view the escape means consisting of a plurality of holes are shown in the outer member; obviously these holes may be formed in the inner element if the conditions warrant. Fig. 8 and Fig. 9 are part sectional views of two types of ends of pipes showing the escape holes in the outer element and in the inner element respectively near the points of the flange connections; obviously the holes may be formed in either inner or outer elements, and in number and disposition as desired.

Referring specifically to the drawings in which like reference characters denote like parts, 1 is the outer element of the pipe while 2 represents the inner element, 3 being a corrugation in the outer element and 4 the same in the inner element, 5 represents a wire, cord or other substance of circular or other cross-section that may be used at times if desired to prevent the collapse of the corrugations when the latter is only in one element, 6 represents holes in the inner element while 7 represents holes in the outer element. Obviously in some instances, the wire, or cord, may only be used to assist in the formation of the corrugations in the process of manufacture and may afterward be withdrawn if the purpose for which the pipe is to be used permits.

The process employed in the lining of piping or tubing either inside or outside may vary according to conditions, but in some cases may be accomplished by forming the corrugations in one element and then assembling the two elements and forming the corresponding corrugations in the other by the application of a suitable liquid or gaseous pressure applied externally or internally as the case may require. The manner of forming the holes may be varied to suit conditions but in some cases I may conclude to drill them before the pipe elements are assembled.

Having thus described my invention, its objects, advantages, etc., I claim:

1. A pipe having inner and outer tubular elements, an escape means from the space between the said elements, the said escape

means being formed in the wall of one of the tubular elements.

2. A pipe having inner and outer tubular elements, an escape means from the space between the said elements, the said escape means being formed in the wall of one of the tubular elements and corrugations formed in the wall of one of the said tubular elements.

3. A pipe having inner and outer tubular elements, an escape means from the space between the said elements, the said escape means being formed in the wall of one of the tubular elements and corrugations formed in the wall of both of the said tubular elements.

4. A pipe having inner and outer tubular elements, a plurality of holes being formed in the wall of one of the tubular elements and corrugations formed in the wall of one of the said tubular elements.

5. A pipe having inner and outer tubular elements, a plurality of holes being formed in the wall of one of the tubular elements and corrugations formed in the wall of both of the said tubular elements.

6. A pipe having inner and outer tubular elements, a plurality of holes being formed in the wall of one of the tubular elements and peripheral corrugations formed in the wall of one of the said tubular elements.

7. A pipe having inner and outer tubular elements, a plurality of holes being formed in the wall of one of the tubular elements and peripheral corrugations formed in the wall of both of the said tubular elements.

8. A pipe having inner and outer tubular elements, a plurality of holes being formed in the wall of one of the tubular elements, annular corrugations formed in the wall or flanges of one of the said tubular elements.

9. A pipe having inner and outer tubular elements, a plurality of holes being formed in the wall of one of the tubular elements and annular corrugations formed in the wall or the flanges of both of the said tubular elements.

In testimony whereof, I, ROBERT STOCKER have signed my name to this specification in the presence of two subscribing witnesses, this 27th day of February 1915.

ROBERT STOCKER.

Witnesses:

ALBERT A. LEITCH,
JOHN T. MACKEY.