

J. HOPKIRE.  
CONVEYER PIPE.

APPLICATION FILED SEPT. 28, 1906.

930,668.

Patented Aug. 10, 1909.

Fig. 3.

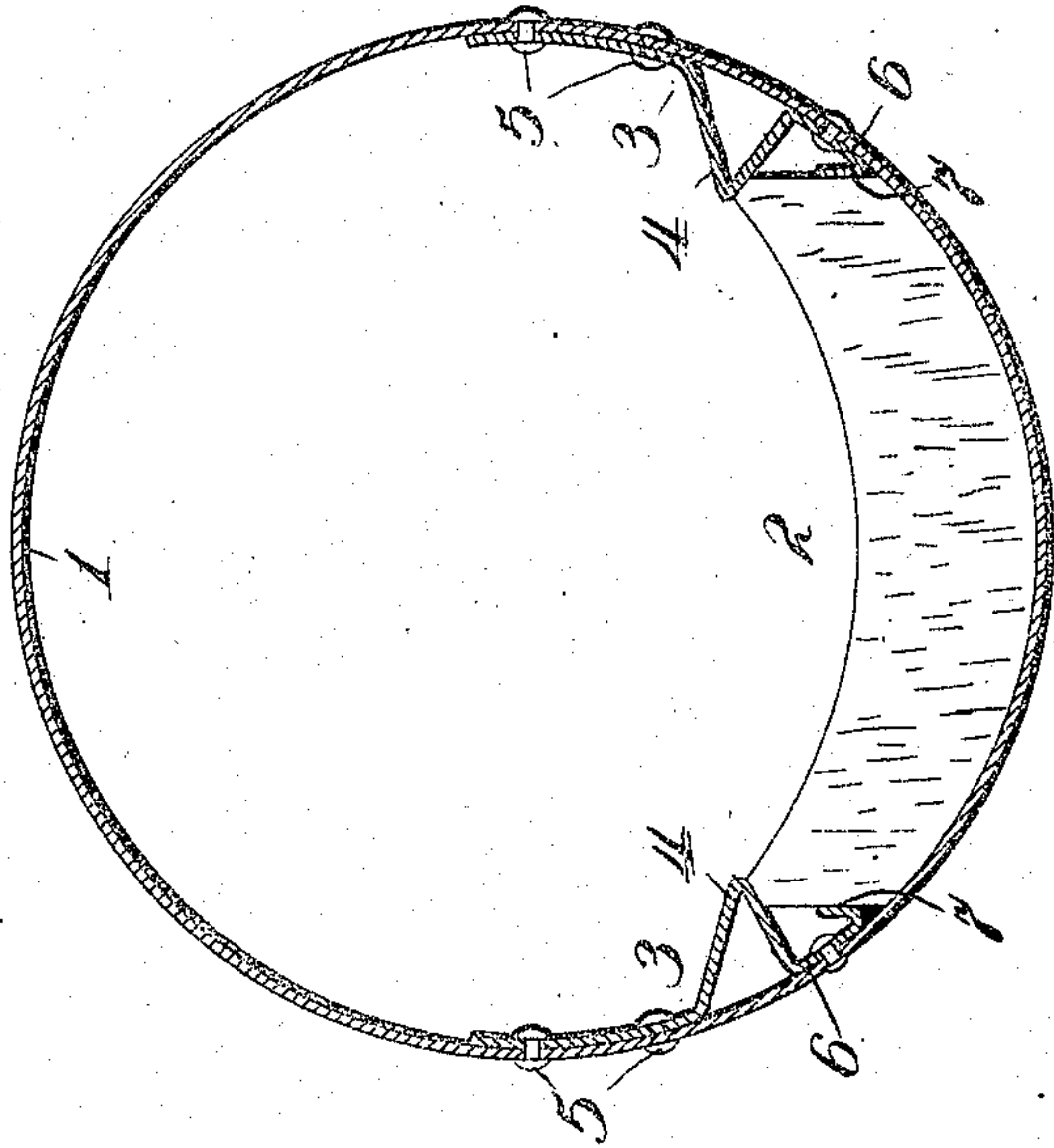


Fig. 2.

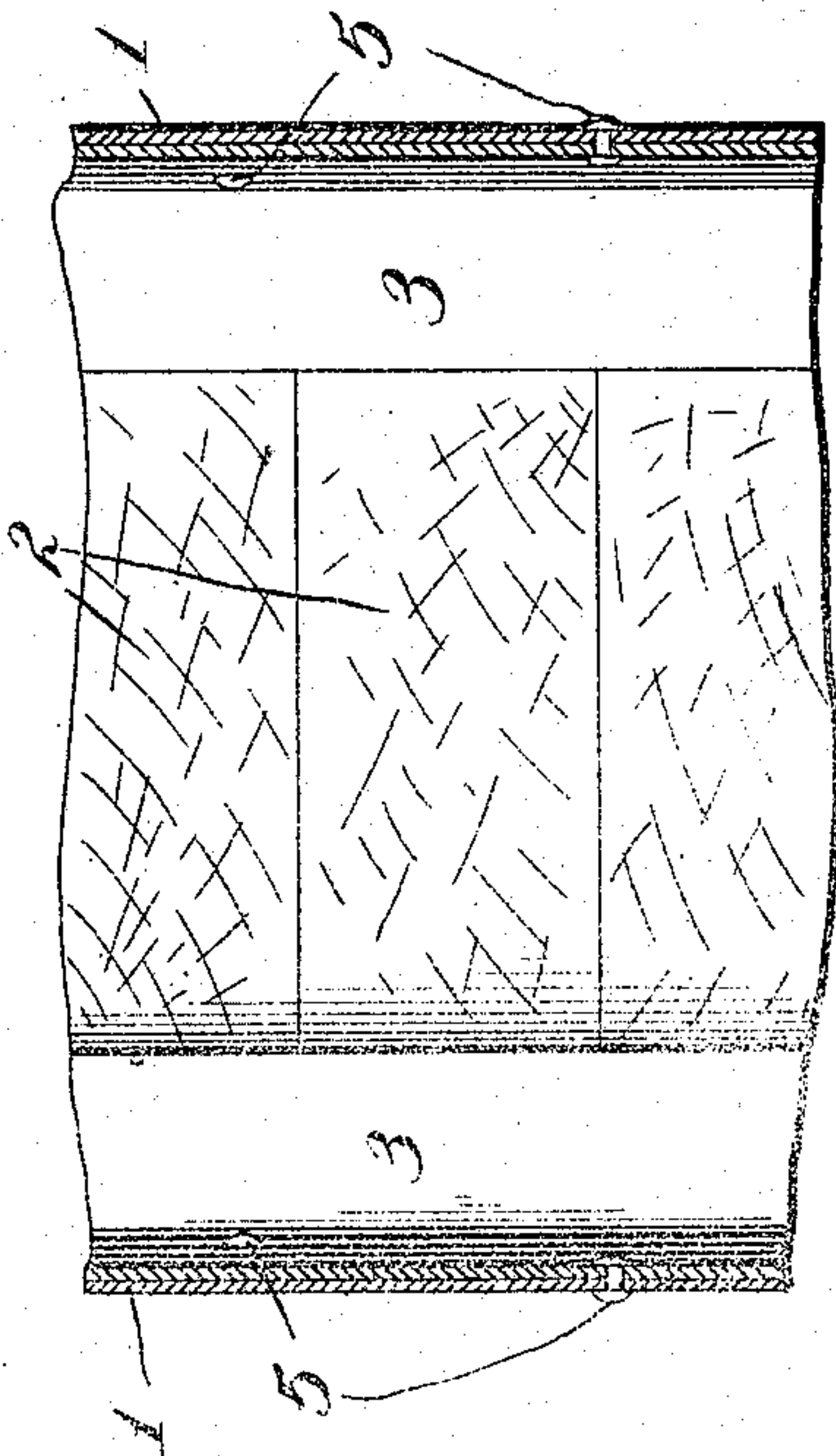
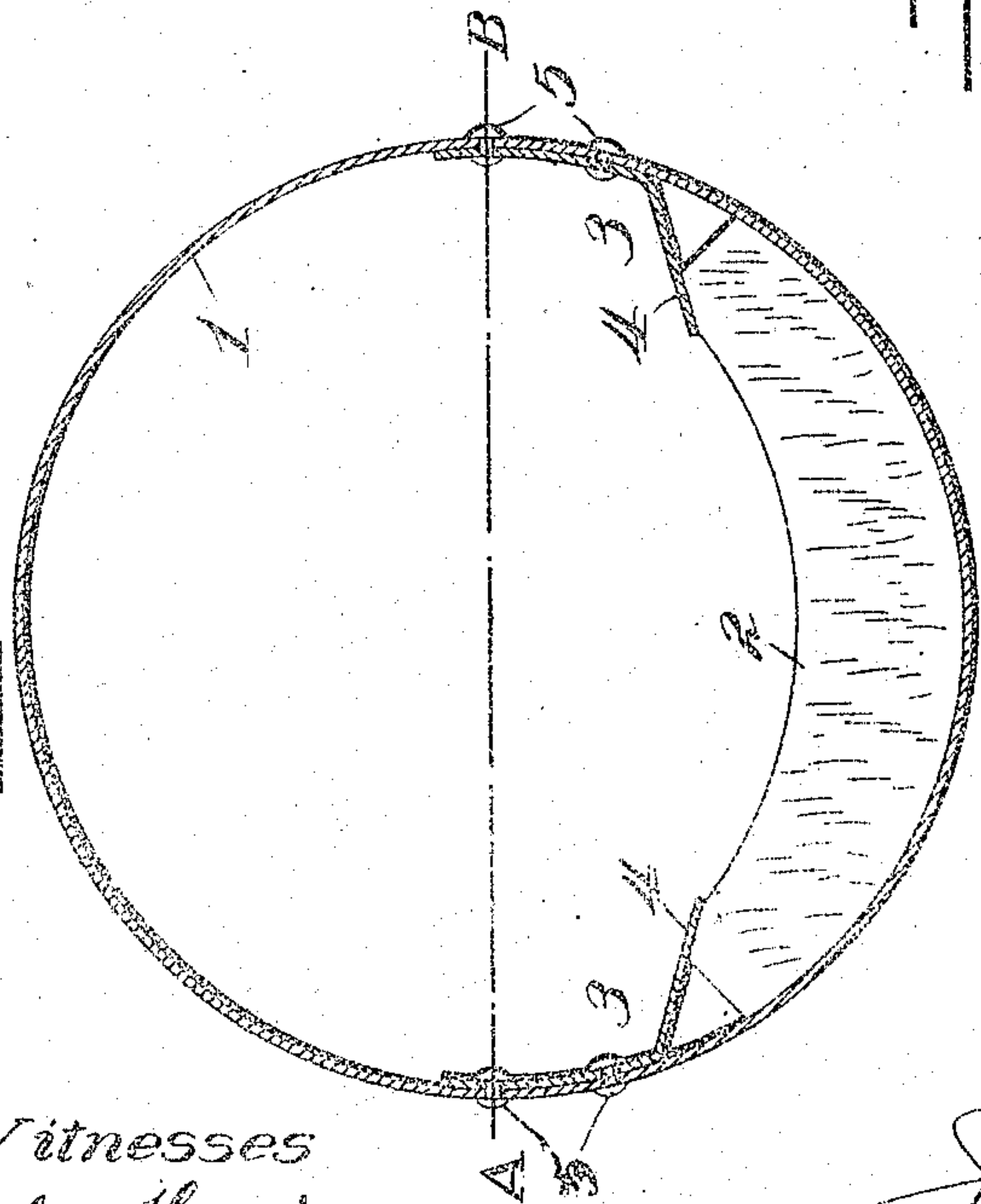


Fig. 1.



Witnesses  
Milton Lenoir  
Clara Phillips

Inventor  
James Hopkirk  
By John D. Morgan  
Attorney



# UNITED STATES PATENT OFFICE.

JAMES HOPKIRK, OF SEATTLE, WASHINGTON, ASSIGNOR OF TWO-THIRDS TO CHARLES S. WILEY AND WILLIAM H. LEWIS, OF SEATTLE, WASHINGTON.

## CONVEYER-PIPE.

No. 930,668.

Specification of Letters Patent.

Patented Aug. 10, 1909.

Application filed September 28, 1906. Serial No. 336,561.

*To all whom it may concern:*

Be it known that I, JAMES HOPKIRK, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented new and useful Improvements in Conveyer-Pipes, of which the following is a specification.

The invention relates to conveyer pipes and more particularly to pipes which are used for conveying earth and similar materials by means of a flow of water.

Objects of the invention are to provide a pipe of great efficiency and comparatively low cost of manufacture and maintenance.

Further objects of the invention are to provide a combined surface within the conveyer pipe which will present great wear-resisting qualities where necessary and at the same time also provide a high conveying capacity; which will possess great durability and at the same time offer little frictional resistance to the flow of materials and fluids through the pipe; to provide for holding the wear blocks securely in position and yet permit of their being readily removed when desired and to provide at the same time for protecting the blocks except upon the surfaces which it is desired to expose for wear.

These and other objects of invention will in part be obvious and will in part more fully appear from the specification.

The invention consists in the novel parts, articles, improvements, arrangements and combinations herein shown and described.

The accompanying drawings, referred to herein and forming a part hereof, illustrate one embodiment of the invention, the same serving in connection with the description herein to explain the principles of the invention.

Of the drawings: Figure 1 is a vertical sectional view of a pipe constructed in accordance with the principles of the invention; Fig. 2 is a fragmentary transverse section near the central horizontal axis of the pipe looking downward; and Fig. 3 is a vertical section of a modified form.

Referring to the accompanying drawings which illustrate by way of example a conveyer pipe embodying the principles of the invention, a casing which will usually be cylindrical in form, is shown and indicated by the reference numeral 1. The said casing may be composed of various materials, if desired, but iron or steel will be found suitable for various reasons, such as, comparatively low

cost, ease of manufacture, and great strength and durability for amount of material involved. Arranged within the said casing 1 so as to cover the lower portion of the interior surface thereof, is shown a removable floor of wood or other wear resisting material, for taking up the wear due to the attrition caused by the particles of solid matter carried along in the stream of water passing through the conveyer pipe. As shown herein, the said floor consists of a series of blocks 2 of wood of arcual and segmental form. So far as concerns certain features of the invention, however, such floor may be of some other form. The said blocks may also be arranged so that the grain is substantially radially arranged, that is, the end of the grain is presented as a wearing surface to the passing material, it being well known that wood placed with the grain so arranged provides a superior wearing surface.

Suitable means are provided for holding the blocks securely in position, said means at the same time permitting their ready removal when it is desired to renew the blocks after the old ones are so worn as to be no longer suitable for use. It is also desirable to protect the ends of the blocks from the action of the solid materials passing through the pipe, as otherwise the ends of the blocks would be subjected to great wear and the finer particles of materials would gradually work underneath the blocks and tend to dislodge or lift them away from the casing 1 to a greater or less degree. Means for accomplishing these ends are provided in the present invention and are shown herein in the form of continuous strips 3 arranged longitudinally of the pipe casing on its interior side. The said strips are shown as of angled form, one part extending outwardly so as to form a flange 4 which takes over the ends of the wooden blocks constituting the floor or lining of the pipes, the other portion of the said strips 3 being curved so as to fit snugly the interior facing of the pipe. The said curved portion of the strips is attached to the interior surface of the casing 1 in any suitable manner, as for instance by a double row of rivets 5, as shown in the drawings. The curved portion of the strips may be proportioned so as to continue up inside the casing above the central horizontal axis of the pipe. By such an arrangement all the wear is taken up by the wooden blocks 2 and the metal strips 3.



In Fig. 3 of the drawings a modified form of the strips 3 is shown. In this form the strip is shown as being bent outwardly and then bent back upon itself, the end being attached to the casing 1, as at 6, by suitable means such as a line of rivets, and then being bent again so as to present a smooth, vertical edge 7 to the block 2, such edge serving to present a surface past which the blocks may be readily slid during their insertion and removal and which will also hold them accurately to position in the pipe.

Great advantages are secured by means of the use of the metal casing and the interior floor of wooden blocks to which the invention in certain of its features is directed. The metal pipes are not liable to become leaky by alternate wettings and dryings, and while offering less friction in the first instance than wooden surfaces they also gradually take on a polish which still further decreases the friction. This gives a material increase in the conveying capacity of the pipe for a given cross-sectional area of pipe and a given flow or pressure of water. The wooden blocks on the other hand serve to take up substantially all the wear and being renewable provide with the casing a pipe which is of very high efficiency and approximately unlimited durability. It will be further noted that the metal casing or pipe proper is protected on its interior by either the wooden blocks or the metal strips to a point just above the horizontal axis of the pipe so that substantially the entire wear is taken up upon the said auxiliary surfaces.

From all the foregoing it will be understood that a conveyer pipe has been provided which realizes the objects of invention and the advantages hereinbefore set forth, together with other objects and advantages.

The invention, in its broader aspects, is not limited to the particular construction shown, nor to any particular constructions by which it has been or may be carried into effect, as many changes may be made in the construction without departing from the main principles of the invention and without sacrificing its chief advantages.

What I do claim as my invention and desire to secure by Letters Patent, is:

1. A conveyer pipe including in combination a metal casing, a wooden floor covering the lower part of the interior of the said casing, and means for holding the said wooden floor in position said means being attached to said metal casing, and engaging but not passing through said lining.

2. A conveyer pipe including in combination a metal casing, a wooden floor for the lower part of the interior of the said casing, and flanges fixed to the pipe so as to detachably hold the said floor in position.

3. A conveyer pipe, including in combination a metal casing, a wear-taking lining, cov-

ering the lower part of the interior of said casing, and means for holding said lining in position, said means being attached to said metal casing, and engaging but not passing through said lining.

4. A conveyer pipe including in combination a metal casing, a series of arcual, segmental wooden blocks having the grain substantially radially arranged to form a floor within the said casing, and a flange on either side of the said casing taking over the ends of the said blocks so as to removably hold the blocks in position and to protect their ends from the material moving through the conveyer pipe.

5. A conveyer pipe including in combination a sheet metal casing, a series of arcual, segmental blocks arranged to form a floor within the said casing, and means within and riveted to the said casing for taking over the ends of the wooden blocks so as to removably hold the blocks in position.

6. A conveyer pipe including in combination a sheet metal casing, a series of arcual, segmental blocks arranged to form a floor within the said casing, a strip riveted to the said casing upon its inner side and extending longitudinally of the casing, said strip engaging the said blocks so as to removably hold the blocks in position within the casing.

7. A conveyer pipe including in combination a metal casing, a series of arcual, segmental wooden blocks arranged to form a floor within the said casing, and two angled continuous metal strips attached to the said casing on its inner surface, one portion of each strip extending outwardly to form a flange beneath which the wooden blocks fit so as to be held to position and so as to have their ends protected from the action of materials passing through the pipe, the other part of said angled strips being curved to conform to the casing and extending upwardly beyond the middle diameter of the casing.

8. A conveyer pipe including in combination a metal casing, a series of arcual, segmental wooden blocks arranged to form a floor within the said casing, and two angled continuous metal strips attached to the said casing on its inner surface, one portion of each strip being curved to conform to the casing and being attached thereto by suitable means, another portion of each strip being bent outwardly and then bent back upon itself and having its edge also attached to the casing, said strips constituting means for holding the blocks in position and for protecting their ends from the action of the materials conveyed through the pipe.

9. A conveyer pipe including in combination a casing, a wooden floor for the lower part of the interior of the said casing, and flanges fixed to the pipe so as to detachably hold the said floor in position.

10. A conveyer pipe including in combination a casing, wear-taking blocks for the



lower part of the interior of said casing and flanges fixed to the pipe, so as to detachably hold said blocks in position.

5 11. A conveyer pipe including in combination a casing, a series of arcual, segmental wooden blocks arranged to form a floor within the said casing, and a flange on either side of the said casing taking over the ends of the said blocks so as to removably hold the  
10 blocks in position and to protect their ends from the material moving through the conveyer pipe.

12. A conveyer pipe including in combination a casing, a series of arcual, segmental  
15 blocks arranged to form a floor within the said casing, and strips attached to the said casing, extending longitudinally thereof and shaped so as to take over the ends of the wooden blocks so as to removably hold the  
20 blocks in position.

13. A conveyer pipe including in combination a casing, a series of arcual, segmental wooden blocks arranged to form a floor with-

in the said casing, and two continuous metal strips attached to the said circular casing, 25 extending longitudinally thereof, and shaped so as to take over the ends of the wooden blocks so as to removably hold the blocks in position and to protect their ends from the action of the material conveyed through 30 the pipe.

14. In a pipe construction, a casing, a lining extending part way around the interior thereof, and means for protecting the side edges of said lining from the wearing action 35 of materials conveyed through said casing, said means being of a relatively harder material than said lining and covering the side portions thereof.

In testimony whereof, I have signed my 40 name to this specification, in the presence of two subscribing witnesses.

JAMES HOPKIRK.

Witnesses:

R. M. TE ROLLER,  
JAMES HAYES.