July 1, 1924. 1,499,781

F. L. PILLIOD

PIPE COVERING AND METHOD OF MAKING SAME

Filed Nov. 6, 1922 2 Sheets-Sheet 1

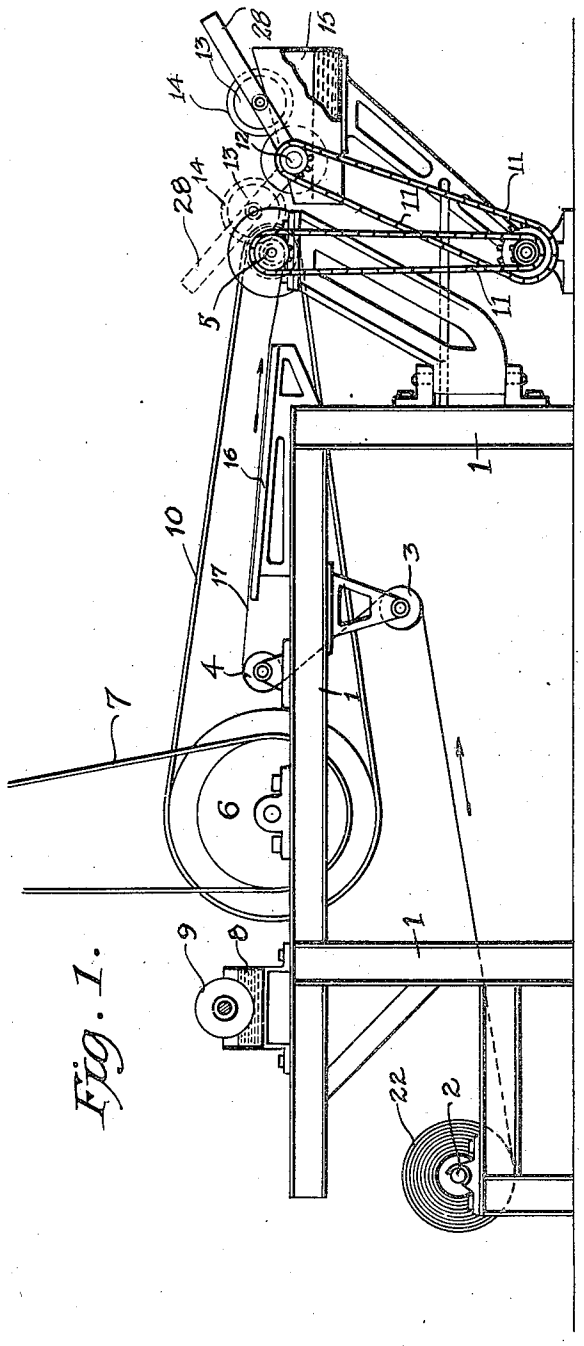


Fig. 1.

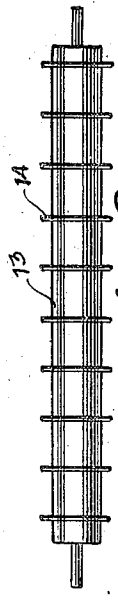


Fig. 2.

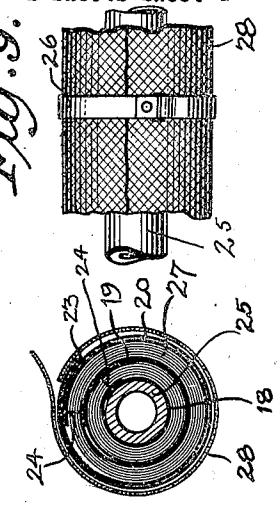


Fig. 8.

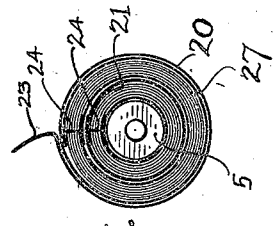


Fig. 7.

Fig. 9.

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PIPE COVERING AND METHOD OF MAKING SAME

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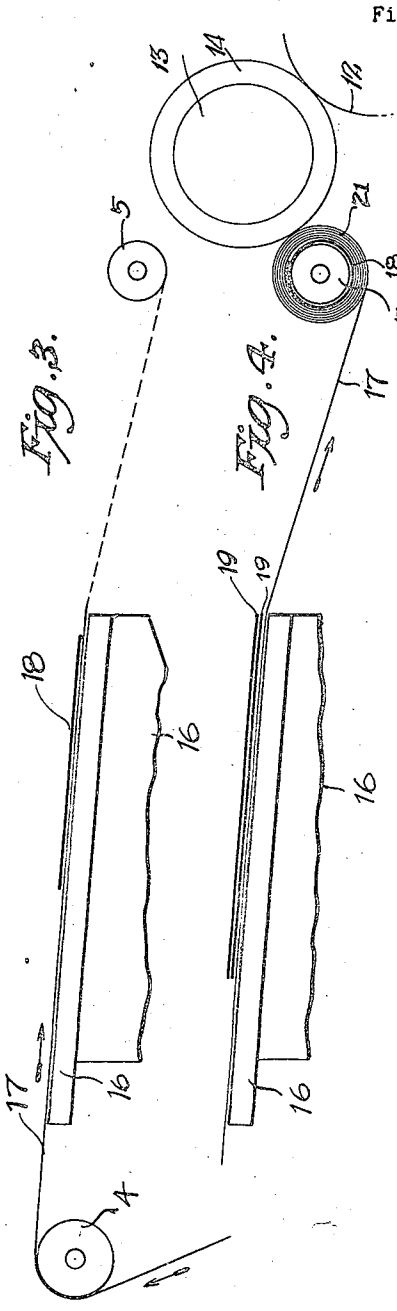


Fig. 3.

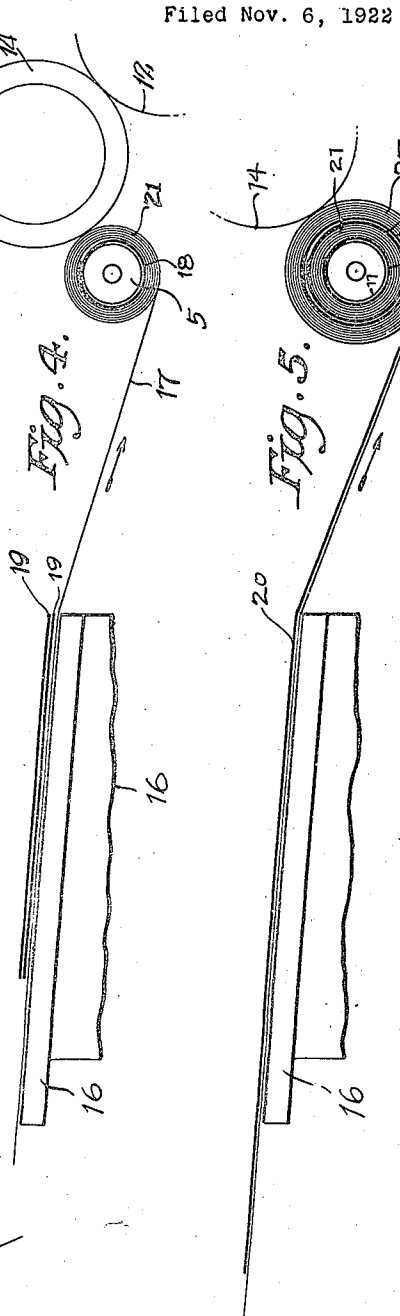


Fig. 4.

Fig. 5.

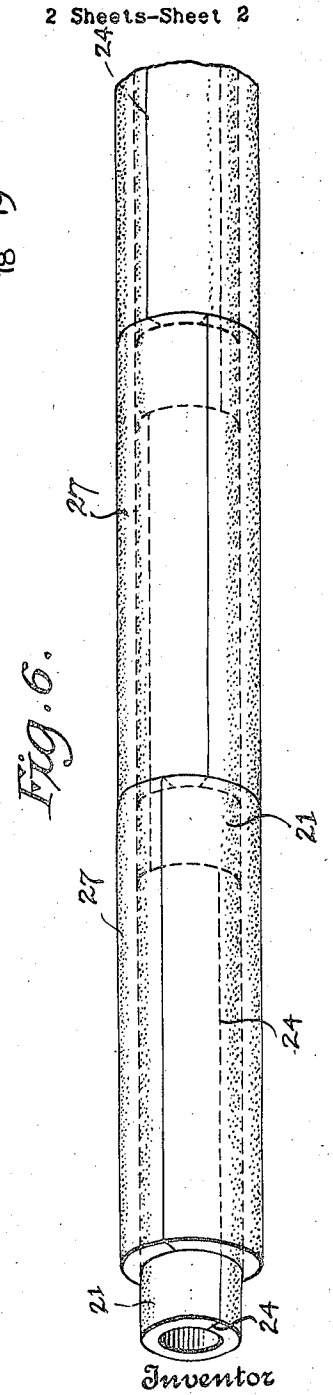


Fig. 6.

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UNITED STATES PATENT OFFICE.

FREDERIC L. PILLIOD, OF PLAINFIELD, NEW JERSEY, ASSIGNOR TO JOHNS-MANVILLE INCORPORATED, A CORPORATION OF NEW YORK.

PIPE COVERING AND METHOD OF MAKING SAME.

Application filed November 6, 1922. Serial No. 599,180.

To all whom it may concern:

Be it known that I, FREDERIC L. PILLIOD, a citizen of the United States of America, residing at 1216 Evergreen Avenue, Plainfield, county of Union, New Jersey, have invented certain new and useful Improvements in Pipe Coverings and Methods of Making Same, of which the following is a specification.

My invention relates to the manufacture of non-heat conducting covering for steampipes or water-pipes, etc., and more particularly comprises certain improvements in the particular character of sectional pipe covering designed for use on pipe conveying a cold fluid, the function of said covering being to protect the fluid from access of heat and to prevent the deposition of moisture on the surface of the pipe, such as would otherwise result from condensation thereon of moisture of the atmosphere.

Pipe covering of this kind is generally made by winding up a web of some light porous material, such as woolfelt, and the problem is to protect said material from the action of moisture which tends to disintegrate the same and to do this without unduly increasing the cost and difficulty of the process of manufacture.

My present invention accomplishes these desired results and the completed pipe covering and the various steps of its manufacture are illustrated in the accompanying two sheets of drawings in which—

Fig. 1 is a side elevation of the preferred form of apparatus on which my pipe covering may be manufactured, parts being shown in section or broken away;

Fig. 2 is a detailed view of the preferred form of the paste-applying roller forming a part of this apparatus;

Figs. 3, 4 and 5 are diagrammatic views with parts broken away showing various stages of the winding operation by which the pipe covering is formed;

Fig. 6 is a perspective view showing several lengths of the pipe covering as the same are assembled in use;

Fig. 7 is an end view of a section of pipe covering after the same has been slit longitudinally, but before the final covering has been applied;

Fig. 8 is an end view of the completed covering applied to the pipe, the latter being shown in cross-section, and

Fig. 9 is a side view of the pipe and covering, parts being broken away.

Throughout the drawings like reference characters indicate like parts.

1 is the main frame of the winding machine on which is supported the spool 2, the guide rollers 3 and 4 and mandrel 5 for handling the web of wool-felt 17 which is originally wound up in a roll 22 on spool 2. 6 is a pulley which is driven by the power belt 7 and from which motion is transmitted by belt 10 to the mandrel 5. 8 is a fountain of liquid cementitious material, such as a solution of silicate of soda in which the freely journaled roller 9 is partly immersed. 11 is any suitable chain and sprocket gearing by which motion is transmitted from mandrel 5 to paste roller 12 journaled in the paste fountain 15 and in contact with the circular ribs or flanges 14 on the roll 13 which is journaled in the swinging frame 28. This frame is pivoted on the shaft of paste roller 12 so that the roller 12 and the ribs 14 on roll 13 are always in contact. 16 is any suitable table supported by the main frame 1 and over which table the web of wool-felt 17 runs just before reaching the mandrel 5. Preferably silicate of soda solution is also used in the paste reservoir or fountain 15.

Such being the construction of the apparatus the preferred method of winding up sections of wool-felt web 17 to form pipe covering is as follows:

The web of wool-felt 17 is threaded through the machine so that the end thereof rests upon table 16, as illustrated in Fig. 3.

The operator then takes a strip of smooth-faced material 18, which is preferably asbestos paper previously saturated in asphaltum so as to make it waterproof and which has a length equal to the width of the wool-felt web 17 and width sufficient to wind once around the mandrel 5, and after passing said strip of material 18 over the cement carrying roller 9 so as to coat its under-surface, deposits the strip 18 upon the end of the web 17, as shown in Fig. 3, thus cementing said strip to the end of said web. The end of the wool-felt web 17 and the attached strip of paper 18 is then fastened to the mandrel 5, as indicated in dotted lines in Fig. 3 by any suitable form of device and the pulley 6 is rotated by the power belt 7 in a direction such as to give said mandrel rotation in a

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counter-clockwise direction. This winds the web of wool-felt 17 up on mandrel 5 with the strip of paper 18 on the inside of the tube so formed, as indicated in Fig. 4, until a given thickness of wall of the tube so formed is attained. Preferably the section of tubing 21 so formed has a thickness of wall approximating one-half the thickness of wall of the desired pipe covering to the manufactured. During this winding operation the swinging frame 28 has been swung over into the position shown in broken lines in Fig. 1 carrying with it the paste roll 13 so that the flanges or ribs 14 thereon have rested upon the exterior of the web of wool-felt 17 as it was being wound upon the mandrel 5. This has caused the superimposed coils of the wool-felt 17 to be cemented together by intervening lines of silicate of soda. When the proper thickness of wall of tube section 21, shown in Fig. 4, has been attained, the winding operation is stopped for an interval of time and the operator picks up two sheets of waterproof asbestos paper 19 which are placed one upon the other, each being long enough to extend across the web of wool-felt 17 and wide enough to wind around the tube section 21 already formed, the under surface of the lower sheet 19 being covered with a coating of cement by passing the two sheets over the paste roller 9. The operator then deposits these two sheets of paper 19 upon the wool-felt supported by table 16 with the cement-bearing surface underneath, as indicated in Fig. 4, thus cementing the underlayer of paper 19 to the wool-felt. The winding up of the wool-felt, and the sheets of paper 19 carried thereby, on the mandrel 5 is then resumed by putting the mandrel again in rotation. As the upper of the two sheets of paper 19 comes in contact with the surface of the tube section 21, as it is rolled on to the same, it is cemented thereto by the action of the strips of silicate of soda which have been deposited on the surface of the tube by the flanges 14 on the paste roller 13.

Continuing the winding-up of the wool-felt web until the tube sections so formed have an aggregate thickness of wall equal to the thickness of wall of the desired pipe covering, a structure such as shown in Fig. 5 is produced in which one of the intertwined sheets of waterproof paper 19 is cemented to the inner surface of the outer section 27 of the tube wall, while the other sheet of paper 19 is cemented to the outer surface of the inner section 21 of said tube. To properly complete the job, the operator then takes a sheet of waterproof asbestos paper 20 which is of a width sufficient to wind twice around the outer section 27 of the pipe covering and, after applying a coating of silicate of soda to the under surface of the said sheet 20 by passing it over paste roller 9, places it upon the web 17 of wool-felt, as indicated in Fig. 5, this being done while the winding is again temporarily interrupted. On resuming winding operations, this sheet of paper 20 is wound twice around the outer section of pipe covering, leaving a projecting flap 23 as shown in Fig. 7. The tube thus formed around the mandrel 5 is then removed therefrom and slit longitudinally along an element of its cylindrical surface, as indicated at 24 in Fig. 7. Preferably, this slitting is done along a radial plane which passes through the overlapping ends of the several sheets of waterproof paper 18, 19 and 20, but this is not necessary. Preferably a final covering of muslin 28 is wrapped around the outer tube and cemented thereto, as indicated in Figs. 8 and 9.

When the covering so formed is applied to a pipe 25, as indicated in Fig. 8, the sections 21, 27, are sprung apart so that they may be snapped over the pipe through the slit 24. The said sections are then twisted and slid one upon the other so as to break joints at their circumferences and ends when a series of sections are placed upon the pipe with their ends abutting as indicated in Fig. 6 Having properly arranged the flap 23 of each section, it is pasted down in the position shown in Fig. 8, and the wrapping 28 also has its flaps held down by any suitable means and preferably a binding strip of flexible metal 26 is drawn tightly around each section, as shown in Fig. 9.

The advantages of my invention comprise the combination with light, porous, heat-insulating wool-felt or similar material, of the layers of dense waterproof paper 18, 19 and 20, or similar material, which completely protect the wool-felt from the access of moisture both from the outside of the covering or from the inside of the covering, the division of the wool-felt body of the covering into two sections which have their opposing faces covered by the hard smooth paper sheets 19, so that they may slip one over the other for the purpose of breaking joints, and the simple and rapid process by which such composite pipe covering is wound up on a rapidly rotating mandrel. The sheets of waterproof paper 19 also form a useful function in preventing access of moisture from one section of the pipe cover to the other so that if the extreme inner or outer covering of the wool-felt is penetrated by moisture only one section of the pipe covering will be deteriorated thereby, the other still being maintained in a dry condition by the intervening sheets of waterproof paper 19.

It is evident that certain minor changes in the arrangement of parts and methods of procedure might be made without departing from the underlying principle of my invention. Thus, for instance, the upper of the two sheets of paper 19 may be dis-

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pensed with and any adhesion of the upper uncemented surface of the lower remaining sheet 19 to the inner section of the pipe covering 21 avoided by lifting the paste roll 13, 14, out of contact with said section 21 while the sheet of paper 19 is being wound in. This would leave the single sheet of paper 19 then used pasted to the inner surface of the outer section 27 of the completed pipe covering, but with its other uncemented surface in contact with a dry and uncemented section of the wool-felt web 17, so that when the completed covering is slit, as shown in Fig. 7, the two sections 21 and 27 may be twisted and shifted one upon the other, as indicated in Figs. 6 and 8, almost as freely as though the two sections of paper 19 had been employed as described in the preferred method of carrying out my invention.

The joints in the inner and outer sections being out of line one with the other, the penetration of moisture through a bad joint in the outer section stops at the outer surface of the inner section, and the same is true of the circulation of air in spaces formed by a bad joint.

Having described my invention, I claim:

1. The herein described process of forming sectional pipe covering which comprises the following steps: first, cementing to the end of a web of non-heat conducting material, such as wool-felt, a strip of waterproof material, such as saturated asbestos paper, which strip of paper is as long as the web is broad and wide enough to extend around the circumference of the pipe to be covered, and then winding the web around a mandrel of proper diameter with the waterproof strip next to the mandrel, and applying cementitious matter to the exterior of said web during the winding process, continuing such winding until a tube is formed of a thickness of wall equal to a predetermined fraction of the thickness of wall of the pipe covering to be produced; second, cementing a second strip of smooth-surfaced material to the same surface of the web of wool-felt as that to which the above mentioned strip has been first applied, said second strip being of a length equal to the width of the said web and of a width sufficient to extend once around the tube then formed by the winding of said web, and superposing on the uncemented face of said strip another of similar size free from cementitious material; third, continuing the winding and cementing of the web until a tube of the thickness of the wall of the desired completed pipe covering is obtained, and, fourth, slitting the wall of said tube lengthwise along one element of the cylinder so formed.

2. The herein described process of forming sectional pipe covering which comprises the following steps: first, cementing to the end of a web of non-heat conducting material, such as wool-felt, a strip of waterproof material, such as saturated asbestos paper, which strip of paper is as long as the web is broad and wide enough to extend around the circumference of the pipe to be covered, and then winding the web around a mandrel of proper diameter with the waterproof strip next to the mandrel, and applying cementitious matter to the exterior of said web during the winding process, continuing such winding until a tube is formed of a thickness of wall equal to a predetermined fraction of the thickness of wall of the pipe covering to be produced; second, cementing a second strip of smooth-surfaced material to the same surface of the web of wool-felt as that to which the above mentioned strip has been first applied, said second strip being of a length equal to the width of the said web and of a width sufficient to extend once around the tube then formed by the winding of said web, and superposing on the uncemented face of said strip another of similar size free from cementitious material; third, continuing the winding and cementing of the web until a tube of the thickness of the wall of the desired completed pipe covering is obtained, cementing to the last wound portion of the web a strip of waterproof material as long as the width of the web and wide enough to extend at least once around the completed tube, and, fourth, slitting the wall of said tube lengthwise along one end of the tube so formed.

3. The process, such as described in claim 2, in which all the inserted strips of material are also waterproof.

4. The process, such as described, in claim 2, in which the inserted strips of material are wound around into the tube in such position that their overlapping edges lie approximately in the same radial plane along which plane the final slitting operation is performed.

5. As an article of manufacture, a sectional pipe covering comprising two nested longitudinally slitted tubes each composed of a superposed layer of non-heat conducting material cemented together and a layer of smooth-faced material located between the adjacent surfaces of two tubes so formed and cemented to one of these only whereby the two tubes when applied to a pipe as a covering therefor can be slid one upon the other both circumferentially and longitudinally for the purpose of breaking joints.

6. As an article of manufacture, sectional pipe covering comprising two nested, longitudinally slitted tubes each composed of superposed layers of a non-heat conducting material with a layer of waterproof material lying between them.

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7. As an article of manufacture, sectional pipe covering comprising two nested, longitudinally slitted tubes each composed of superposed layers of a non-heat conducting material with a layer of waterproof material lying between them, a second layer of waterproof material lining the inner tube and a third layer of waterproof material forming part of the exterior wall of the outer tube.

8. As an article of manufacture a sectional pipe covering comprising two, nested, longitudinally slitted tubes each composed of superposed layers of a non-heat conducting material cemented together with a layer of smooth-faced material cemented to the inner surface of the outer tube and a layer of similar material cemented to the outer surface of the inner tube, whereby when a series of such nested tubes are placed end to end in line one with another the outer tubes may be slid circumferentially and longitudinally upon the inner tubes for the purpose of breaking joints therewith.

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