(No Model.)

A. G. W. RANKIN.

PACKING FOR STEAM CONDENSER TUBES.

No. 337,434. Patented Mar. 9, 1886.

Fig. 1.

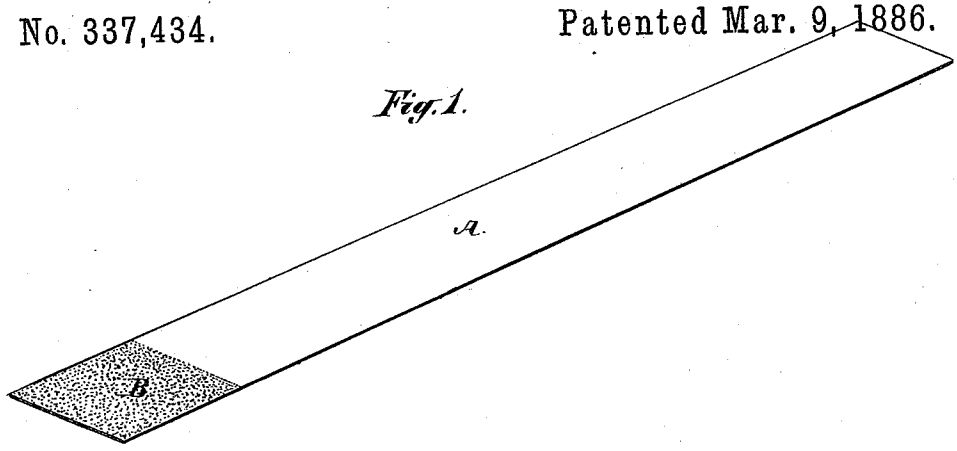


Fig. 2.

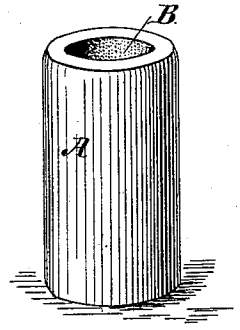


Fig. 3.

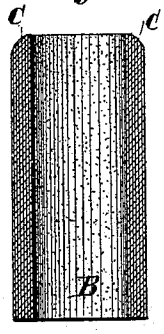
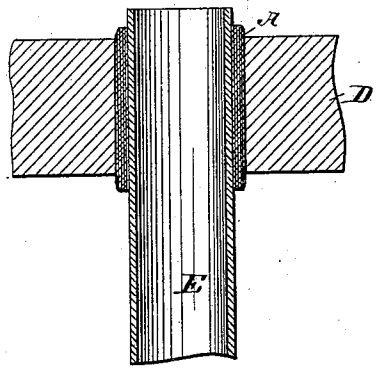


Fig. 4.



Witnesses:
Henry Eichling.
William H. Jewell.

Inventor
Abram G. W. Rankin

N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

ABRAM G. W. RANKIN, OF HUDSON, NEW JERSEY, ASSIGNOR TO WILLIAM H. JEWELL, OF NEW YORK, N. Y.

PACKING FOR STEAM-CONDENSER TUBES.

SPECIFICATION forming part of Letters Patent No. 337,434, dated March 9, 1886.

Application filed June 18, 1885. Serial No. 169,111. (No model.)

To all whom it may concern:

Be it known that I, ABRAM G. W. RANKIN, of Jersey City, in the county of Hudson and State of New Jersey, and a citizen of the United States of America, have invented a new and Improved Packing for Steam-Condenser Tubes, of which the following is a specification, reference being had to the accompanying drawings, forming part of the same, in which—

Figure 1 is a view of a strip of the material of which my packing is to be formed. Fig. 2 is a perspective view of the completed packing. Fig. 3 is a vertical central section of the same, and Fig. 4 is a sectional view of the head-sheet and packing as the same are combined in use.

My invention relates to a packing for forming steam and water tight joints between the tubes and head-sheets of tubular steam-condensers; and it consists in a paper tube formed and treated as hereinafter described.

The joint to be made, to be satisfactory, must be formed of material possessing peculiar properties. It must permit longitudinal movement of the tubes through it, that their alternate expansion and contraction may not force out the packing nor bend the tube, nor yet split the head nor tear the tube away therefrom. It must be of a material that will undergo heat without deterioration and not be injured or worn away by contact with water, and which will not oxidize or cause the tube or the wall of the head-sheet to oxidize. Lastly, the material must be such or so treated that the friction between it and the head-sheet will be sufficient to retain it in its seat, while that between it and the tube will not be so great.

Paper packings possessing some of the above properties have been known for the past fifteen years or more; but all of which I have any knowledge have been such that the friction between them and the tubes was so great that instead of passing easily through them when expanding or contracting the tubes would bend or split the head-sheet of the condenser, thereby causing great inconvenience and loss. This defect it is the purpose of my invention to remedy, and in carrying it out I take a sheet of paper and on one side I cover the same with graphite or some equivalent lubricant for a distance equal or slightly greater than the circumference of the tube for which it is designed. The reverse side of the paper I cover with an adhesive substance, preferably rubber cement. The sheet thus prepared I wind under severe pressure upon a mandrel, the lubricant bending toward said mandrel until the paper tube thus formed is of an external diameter fully equal to that of the opening in the head-sheet in which it is to be seated. It is then dried, and unless the paper was of a width equal to the desired length of the packing is cut to such length, and is then ready for use. If the pressure to which it is subjected while being wound is sufficient, no further pressure is needed, though other methods of obtaining the said compression may be employed. It may then be passed over the tube and swaged to its seat in the head of the tube-sheet, and when water is introduced into the condenser it will absorb sufficient thereof to so expand it as to make a permanent steam and water tight joint, and at the same time possesses the other properties designated as necessary. The lubricant being in contact with the tube, the friction between the tube and packing will be much less than that between the packing and the head-sheet, and thus I attain the particular object of this invention.

I have described the application of the lubricant as being done before the tube is formed; but it is sometimes preferable to first form the tube and then apply the lubricant by means of a brush or otherwise.

I prefer to employ rubber cement as the adhesive substance, as that is less likely to be injured by the action of the water, and while the packing through the exposed end absorbs a sufficient quantity of water to expand it so as to form a steam and water tight joint it parts with it less rapidly than when other adhesive substances are used, and also is less likely to become sodden and wear away from being in contact with the water.

A, Fig. 1, represents the paper of which the packing is composed, and B the graphite deposited thereon.

C, Fig. 3, represents the adhesive substance,

though in practice this is of so little consistency as to be scarcely perceptible in the completed article, except from the discoloration it causes.

D is the tube-sheet, and E the tube with the completed packing A B C interposed between them, as described.

I am aware that paper packings such as are shown and described in Letters Patent No. 156,670 and 6,661, issued to William A. Lighthall on November 10, 1874, and September 28, 1875, respectively, have been some time in use, and I disclaim such, as they have some of the very defects before mentioned, and which it is the purpose of my invention to remove.

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

1. A paper packing composed of a compressed laminated cylinder of paper and an adhesive substance having a lubricant upon its interior surface, formed as described, and for the purpose specified.

2. A paper packing composed of a compressed laminated cylinder of paper and rubber cement and having a lubricant upon its inner surface formed as described, and for the purpose specified.

Signed at New York, in the county of New York and State of New York, this 15th day of June, A. D. 1885.

ABRAM G. W. RANKIN.

Witnesses:

JACOB W. BINGHAM,

WESLEY LEVINESS.