Jan. 26, 1926. 1,570,974

H. V. STEVENS

STEAM PIPE CONNECTION PACKING

Filed Oct. 23, 1924

Fig. 1.

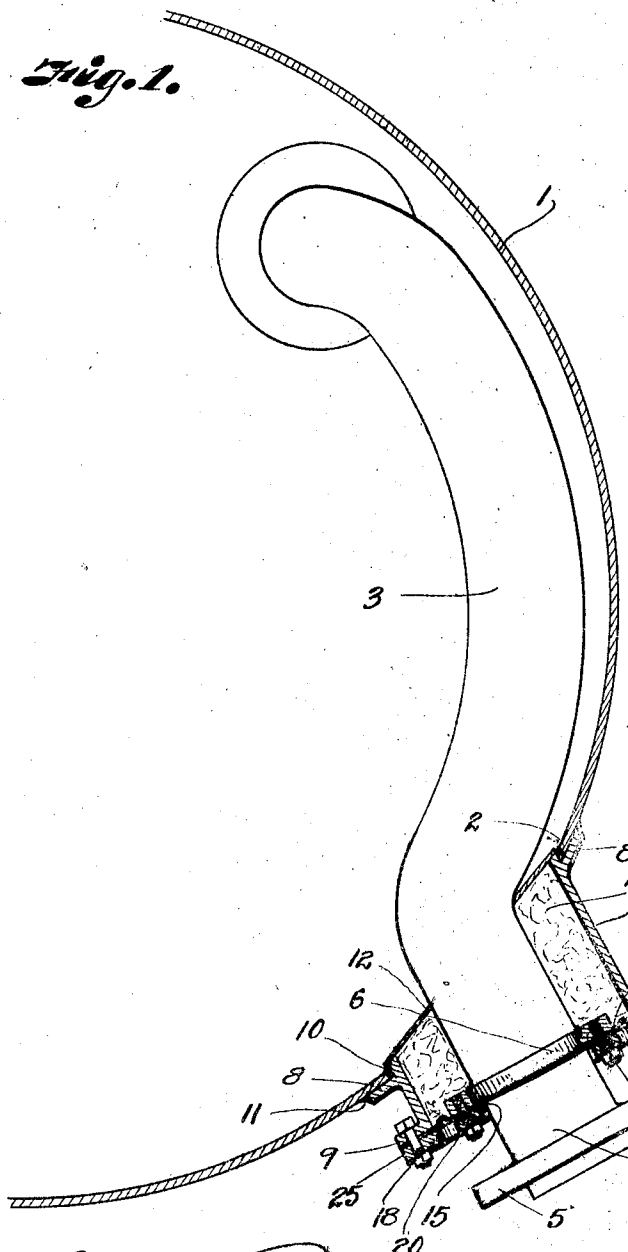


Fig. 2.

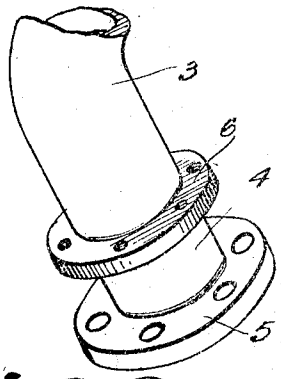


Fig. 3.

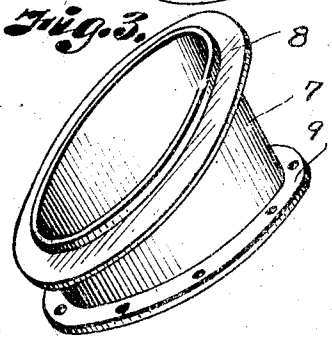


Fig. 4.

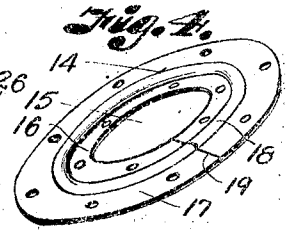


Fig. 5.

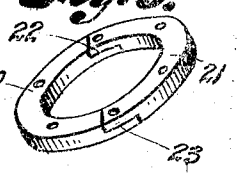
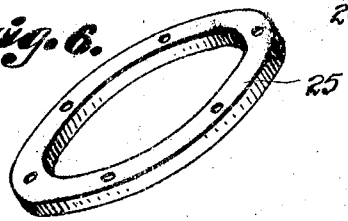


Fig. 6.



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UNITED STATES PATENT OFFICE.

HENRY V. STEVENS, OF TOPEKA, KANSAS.

STEAM-PIPE-CONNECTION PACKING.

Application filed October 23, 1924. Serial No. 745,358.

To all whom it may concern:

Be it known that I, HENRY V. STEVENS, a citizen of the United States, residing at Topeka, in the county of Shawnee and State of Kansas, have invented certain new and useful Improvements in Steam-Pipe-Connection Packings; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to a packing for steam pipes and particularly to a packing for steam pipe connections for locomotives. The steam pipe from the boiler of a locomotive passes through the smoke box in order to supply steam to the cylinders. The furnace of the locomotive is equipped with a forced draft, the forced draft being generated by steam exhausting into the smoke box under the smoke stack as is well understood.

In order to provide the highest forced draft efficiency, the smoke box must be air tight but with the ordinary locomotive construction, the air leaks around the steam pipe where it passes out of the smoke box thereby cutting down the partial vacuum which is created in the smoke box by the steam and consequently cutting down the amount of air that can be drawn through the furnace grate.

By efficiently packing the opening in the smoke box through which the steam pipe passes to make the steam pipe connection with the pipe to the cylinders of the engine, I can eliminate the leakage in the smoke box and this in locomotive practice is a very important feature. I shall hereinafter refer to the invention as a steam pipe connection because it connects the steam pipe to the smoke box in such a manner that leakage will be prevented but it is to be understood of course that the important feature of the invention is the provision of adequate means for making the connection in such a manner that leaks will not occur.

The novelty of the invention will be clearly understood by reference to the following description in connection with the accompanying drawings, in which—

Fig. 1 is a fragmentary sectional view through a conventional smoke box showing my invention applied, the steam pipe being in elevation.

Fig. 2 is a fragmentary perspective view of one end of the steam pipe.

Fig. 3 is a perspective view of the collar surrounding the steam pipe opening.

Fig. 4 is a perspective view of a diaphragm connecting the pipe to the collar.

Fig. 5 is a perspective view of a ring cooperating with the diaphragm and pipe, and

Fig. 6 is a similar view of a ring cooperating with the diaphragm and collar.

The smoke box 1 is of usual construction. It is provided with an opening 2 in its wall through which the steam pipe 3 projects. The steam pipe, it is to be understood is the end of the steam generating coil leading from the boiler and its outer end 4 is to be connected to the steam line to the engine cylinders in the usual way, and for this purpose the usual flange 5 is shown. The pipe 3 is illustrated as provided with a rigid collar 6 spaced from the flange 5. The collar 6 may be cast integral with the pipe 3 for new work or it may be shrunk, bolted or fastened to the pipe 3 by any suitable means where the invention is to be applied on existing installations.

The manner of applying the collar 6 constitutes no part of my invention and it is obvious that any methods may be employed for locating it at the desired point. Fastened to the edge of the opening 2 in the smoke box 1 is a sealing collar 7. The sealing collar 7 is provided with an inner flange 8 and an outer flange 9 at its respective ends, the inner end of the collar 7 projecting slightly beyond the inner flange 8 so that it can be forced into the opening 2 as clearly seen in Fig. 1.

When the collar is in the position shown in Fig. 1, the inner edge of the opening 2 is welded to the smoke box as at 10 and the outer edge of the flange 8 is welded to the

smoke box as indicated at 11. A plate 12 is used as a packing wall to prevent the packing 13 from being pulled into the smoke box by the forced draft nozzle. The plate 12 may be of any material and it may be welded or fastened in any manner to the collar 7. It is to be observed of course that the collar 7 has a diameter considerably in excess of the diameter of the pipe 3 so at the outer end of the collar and the pipe, means must be provided for connecting the two. This is accomplished in the following manner.

A split diaphragm 14 having a central opening 15 substantially the diameter of the pipe 3 is slipped over the flange 5 so that its inner edge 16 will rest upon the collar 6 and its outer edge 17 will rest upon the flange 9. The inner portion 16 is separated from the outer portion 17 by an expansion rib 18 which is concavo-convex or in the form of a corrugation so as to allow for expansion and contraction. Since the diaphragm 14 is provided with a slit 19, it will be apparent that it may be easily slipped over the flange 5 due to the fact that the diaphragm is flexible and easily twisted. After the diaphragm is over the flange 5, the slit 19 can be sealed. The diaphragm is now fastened to the collar and the pipe. This is accomplished in the following manner.

A two-piece ring consisting of two similar circular members 20 and 21 with lap joints 22 and 23 is slipped around the pipe 3 between the collar 6 and the flange 5 and bolts or other suitable fastening devices 24 are then passed through the split ring through the portion 16 of the diaphragm 14 and into the collar 6. Then the ring 25 shown in Fig. 6 is placed upon the outer face of the portion 17 of the diaphragm 14 and it, together with the diaphragm 14 and the flange 9 are fastened in clamped position by the bolts 26.

Since the collar 7 is connected to the smoke box by a sealed joint preferably by welding and since the pipe 3 is connected to the collar 7 by an air tight connection, it will be obvious that no air can leak through the opening 2. Consequently the great disadvantage heretofore encountered when the steam pipe passed through the smoke box will be entirely eliminated, and since the opening 2 or its equivalent is the main cause of leaks in the smoke box, it is apparent that the efficiency of the forced draft device will be materially increased by my invention and while I have described in detail what appears to me to be the very best form of my invention, I do not wish to be limited to the exact details shown for obviously changes in form, proportion and minor details of construction may be resorted to without departing from the spirit of the invention or sacrificing any of its advantages.

What I claim and desire to secure by Letters-Patent is:—

1. In combination, a locomotive smoke box having a steam pipe opening, a steam pipe extending from the smoke box through said opening, a rigid collar surrounding the steam pipe, and separate means connecting the collar with the smoke box and with the steam pipe, one of said connecting means being expansible.

2. In combination, a locomotive smoke box having a steam pipe opening, a steam pipe extending from the smoke box through said opening, a rigid collar surrounding the steam pipe, and separate means connecting opposite ends of the collar with the smoke box and with the steam pipe, one of said means being expansible.

3. In combination, a locomotive smoke box having a steam pipe opening, a steam pipe extending from the smoke box through said opening, a collar surrounding and spaced from the steam pipe, having one end permanently sealed to the smoke box and its other end removably and flexibly connected with the steam pipe, a plate surrounding the inner end of the pipe, sealed to the smoke box and closing said steam pipe opening, and packing within the space formed by the steam pipe, the collar, the flexible connection and said plate.

4. In combination, a locomotive smoke box having a steam pipe opening therein, a steam pipe projecting through the opening, a collar, means for providing an air tight joint between the inner end of the collar and the edge of the opening, a collar on the pipe, a diaphragm connecting the two collars, a packing between the steam pipe and the first named collar, and a plate surrounding the pipe and closing the inner end of the first named collar to prevent the packing from being dislodged by suction in the smoke box.

5. In combination, a locomotive smoke box having a steam pipe opening in its wall, a steam pipe passing through the opening and provided with a collar outside the smoke box, a packing collar projecting from the smoke box wall surrounding the pipe and being of greater diameter than the pipe, a diaphragm having an opening through which the steam pipe projects, a split ring surrounding the pipe fastening devices for clamping the diaphragm between the split ring and the collar on the pipe, a ring having a diameter substantially equal to the diameter of the packing collar and fastening devices clamping the diaphragm between the last mentioned ring and the collar.

6. In combination, a locomotive smoke box having a steam pipe opening in its wall, a steam pipe passing through the opening

and provided with a collar outside the smoke box, a packing collar projecting from the smoke box wall surrounding the pipe and being of greater diameter than the pipe; a diaphragm having an opening through which the steam pipe projects, a split ring surrounding the pipe fastening devices for clamping the diaphragm between the split ring and the collar on the pipe, a ring having a diameter substantially equal to the diameter of the packing collar and fastening devices clamping the diaphragm between the last mentioned ring and the collar, the collar having a concavo-convex portion between its inner and outer edges to permit the diaphragm to expand and contract radially.

7. A packing collar for locomotive smoke boxes comprising a collar having flanges at its respective ends, a ring, a diaphragm, means for clamping the diaphragm between the ring and one of the flanges, a split collar to fit around the steam pipe of the locomotive passing through the smoke box and fastening devices for clamping the diaphragm between the split collar and a portion of the steam pipe.

In testimony whereof I affix my signature:

HENRY V. STEVENS.