

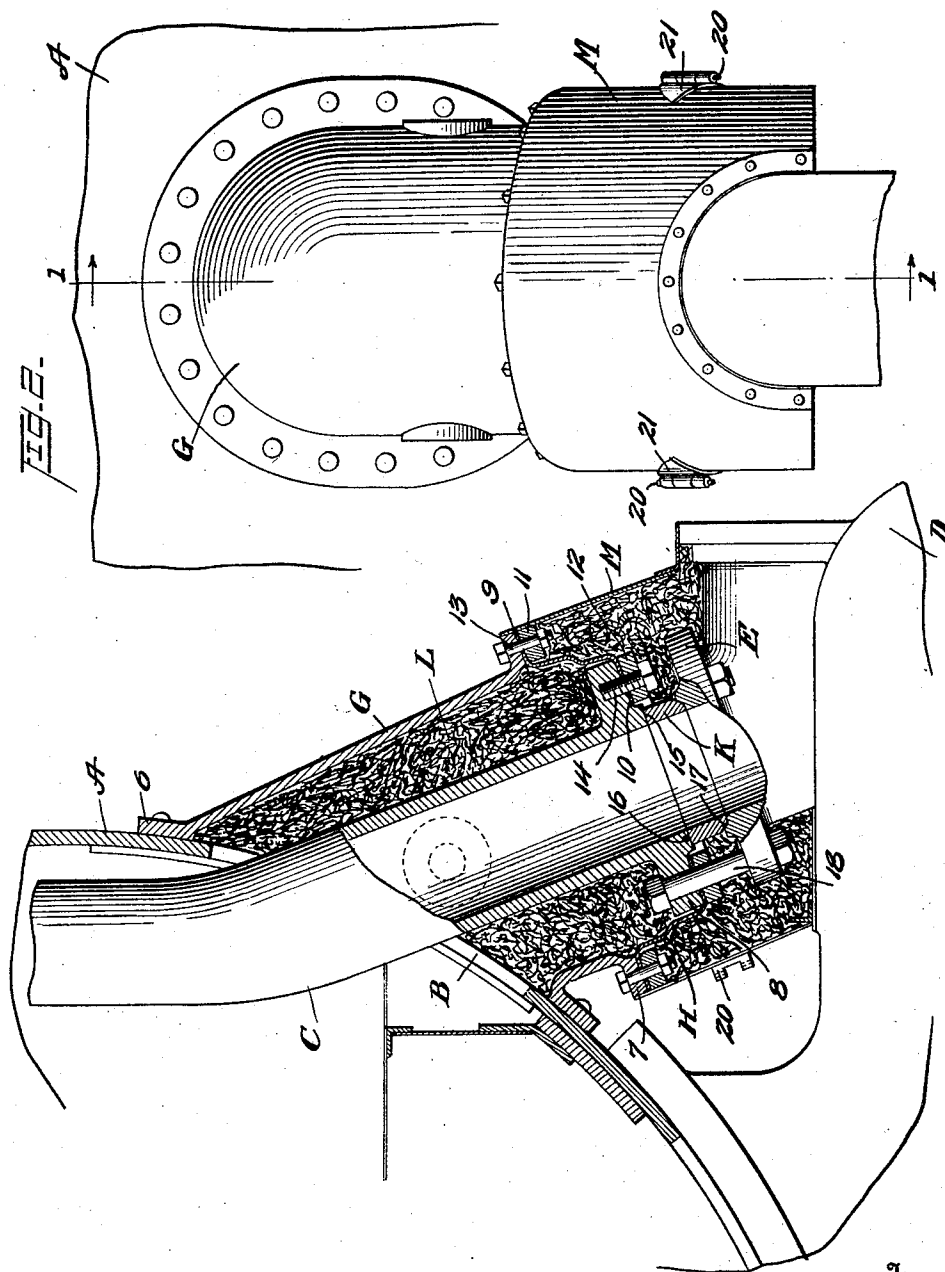
April 29, 1930.

G. D. SPRANKLE

1,756,668

STEAM PIPE CONNECTER

Filed March 30, 1926



Inventor

By *George D. Sprankle*
Watson, Coit, Moore
& Grindley

Attorney

UNITED STATES PATENT OFFICE

GEORGE D. SPRANKLE, OF TIPTON, PENNSYLVANIA

STEAM-PIPE CONNECTER

Application filed March 30, 1926. Serial No. 98,594.

This invention relates to packing joints for pipes passing through the smoke box shell of locomotives, that is, it is concerned with a packing joint for the steam pipes passing through the smoke box from the steam dome of the boiler to the valve chests of the drive cylinders located on either side of the locomotive.

As is well known in locomotive practice, a partial vacuum is maintained in the smoke box of the locomotive to secure a forced draft from the fire box to the smoke box for promoting rapid combustion. The steam pipe passes through the shell of the smoke box and unless an airtight joint is maintained between the shell and pipe air will enter and destroy the vacuum. For such duty a plain flanged joint has been used and found ineffective due to the expansion and contraction of the steam pipe. Various forms of expansion joints have been devised and when once installed have proven quite satisfactory but the installation of these joints was complicated and difficult, most of them requiring another flange on the steam pipe in addition to the one which was made on the end of the pipe for connecting the pipe to the valve chest, or requiring welding of the flexible member to the pipe and smoke box shell or welding along a seam made for assembly purposes in the flexible member itself and this welding, besides taking much time, frequently caused burning of the thin member. The objects of this invention are to provide an improved type of flexible joint which shall be of simple construction providing for convenient assembly, no welding either of flanges to the steam pipe or of the flexible member being necessary; which shall be efficient for preventing air leakage; and which shall be durable in service. Other objects and features of novelty will be apparent from the description taken in connection with the drawings, in which:

Fig. 1 is a section taken on line 1—1 of Fig. 2 showing a portion of the smoke box shell of a locomotive and details of a packing joint according to the present invention; and

Fig. 2 is a side elevation of the assembled structure.

Referring to the drawings, in which one form of my invention has been illustrated, A designates the smoke box shell of a locomotive which shell has an opening B for a steam pipe C. In order that the steam pipe C may be readily inserted through said shell, the opening B in the shell is made of considerably larger diameter than the outside diameter of the steam pipe. The steam pipe C extends through this opening to the valve chest of a drive cylinder D of the locomotive, the valve chest having a flanged steam pipe connection E for connecting the steam pipe thereto. Permanently secured, as by riveting to the shell A around the opening B, is a sleeve or cover G having a flange 6 fitting the boiler shell and sealed thereto by calking or otherwise to provide an air-tight joint with the outside of the shell. At its lower end this sleeve has a flange 7 for a purpose which will be presently described. The steam pipe extends through this sleeve and beyond the lower end thereof and at its lower end the steam pipe C has a flange 8 which is drilled and tapped for the reception of stud bolts.

It is necessary to provide a connection between sleeve G and pipe C which shall prevent air leakage and which shall at the same time be sufficiently flexible to take care of expansion and contraction and for this purpose a diaphragm extends between them and has its outer edge 9 clamped to sleeve flange 7 by a ring 11 and bolts 13, and its inner edge 10 clamped to pipe flange 8 by a ring 12 and stud bolts 14. This diaphragm is made of a resilient metal, preferably soft steel, which will provide the necessary adjustment for expansion and which will not crack under repeated flexing.

Particular attention is directed to the construction and assembly of the parts of the flexible coupling between the sleeve and steam pipe just described. The steam pipe and sleeve, it will be noted, have only single flanges at their lower ends. The flexible diaphragm is made as a single uncut pressed piece which needs only to be slipped into place beneath the flanges on the ends of the steam pipe and sleeve and secured by single unsplit rings. This provides a ready and

convenient method of assembly and avoids welding of the diaphragm to either the sleeve of pipe, or welding of the diaphragm along a seam cut for assembly purposes as has heretofore been necessary.

In assembling this device upon a locomotive, it will be assumed that sleeve G has already been riveted and calked upon the boiler shell around the opening B, this being done more conveniently when the boiler is made. Pipe C with stud bolts 14 in place is inserted in the sleeve and held in a raised position. The ring 12 is temporarily placed upon flange E and a joint piece K having a ground spherical surface 17 to fit a mating ground spherical surface on the valve chest casting and a ground flat upper surface 15 to abut a mating surface 16 on the steam pipe is slipped into place on the cylinder casting. Diaphragm H and ring 11 are next slipped beneath the end of the steam pipe and secured to sleeve flange 7 by bolts 13. The steam pipe is lowered until stud bolts 14 extend through holes provided therefor in diaphragm H and ring 12 and is clamped to the diaphragm by ring 12 and nuts applied to the stud bolts 14.

Joint piece K is clamped between the cylinder casting and steam pipe by bolts 18 and nuts therefor. Suitable lagging or heat insulating material L may be placed in the annular space between the sleeve and steam pipe and around the flexible joint section, the insulating material being held in place by a casing M which is made in sections secured together by pins 20 passed through holes in mating buckles 21 secured to edges of the sections.

While I have shown my invention in one form, it is evident that it may have other forms within the scope of the appended claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A device of the character described, including in combination, a locomotive smoke box shell having an opening, a steam pipe passing freely through said opening and connected to the steam chest outside of said smoke box, a flanged sleeve spaced from and surrounding said pipe and sealed to said shell around said opening, a single flange on said steam pipe at its lower end and a dished unsplit flexible diaphragm secured to the flanges of said pipe and said sleeve.

2. In a device of the character described, including in combination, a locomotive smoke box shell having an opening, a valve chest having a flanged pipe connection, a steam pipe passing freely through said opening and having a single flange on its lower end, a sleeve spaced from and surrounding said steam pipe, a flange on the upper end of said sleeve sealed to said shell around said opening, a flange on the lower end of said

sleeve, an unsplit flexible diaphragm secured beneath said flanges of said pipe and said sleeve, one piece unsplit rings securing said diaphragm to said flanges, a joint piece disposed between said pipe flange and the flanged pipe connection and securing means for said joint piece, said securing means passing through said pipe flange, said diaphragm, the flange of said pipe connection and one of said rings.

3. A flexible joint of the character described, comprising a pipe, a flange on the end of said pipe, a sleeve surrounding said pipe, a flange on said sleeve, a single unsplit flexible diaphragm connecting said pipe flange and said sleeve flange, a valve chest flange, a joint piece disposed between said pipe flange and said valve chest flange and securing means between said pipe flange and said valve chest flange.

4. In combination, a locomotive smoke box shell having an opening therethru, a steam pipe projecting outwardly through said opening and being of less diameter than said opening, a sleeve of larger diameter than said pipe secured to said shell and surrounding said pipe, flanges at the extreme lower ends of said sleeve and pipe, and a continuous ring of yieldable means secured to said end flanges of the pipe and sleeve to seal the annular space between the pipe and sleeve.

5. A flexible joint of the character described, comprising a pipe, a flange on the end of said pipe, a sleeve surrounding said pipe, a flange on said sleeve adjacent the pipe flange, and a single unsplit flexible diaphragm connecting said pipe flange and said sleeve flange.

In testimony whereof I hereunto affix my signature.

GEORGE D. SPRANKLE.