

(No Model.)

J. B. MORGAN.
WATER LUBRICATED STEAM JOINT.

No. 543,046.

Patented July 23, 1895.

Fig. 1.

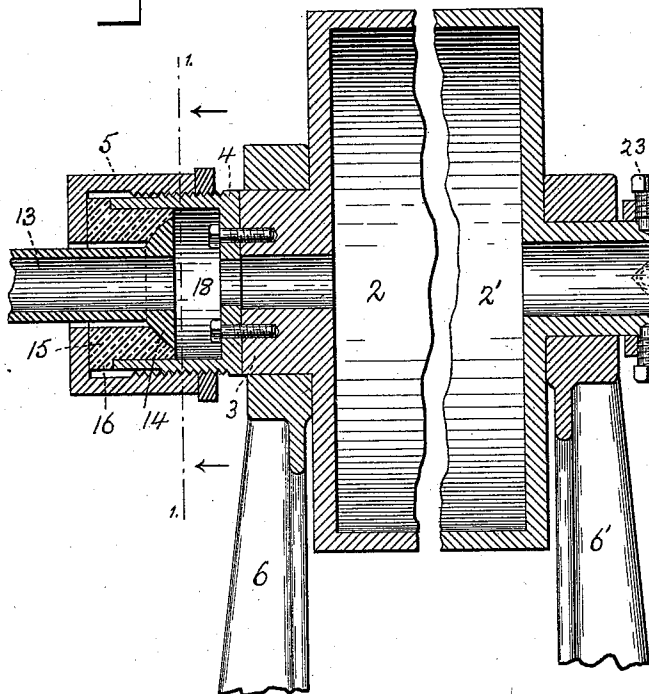


Fig. 2.

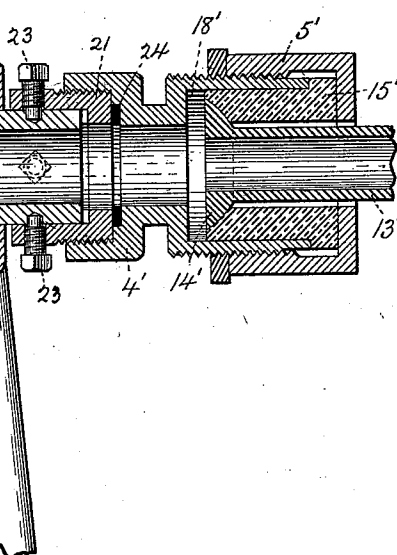


Fig. 3.

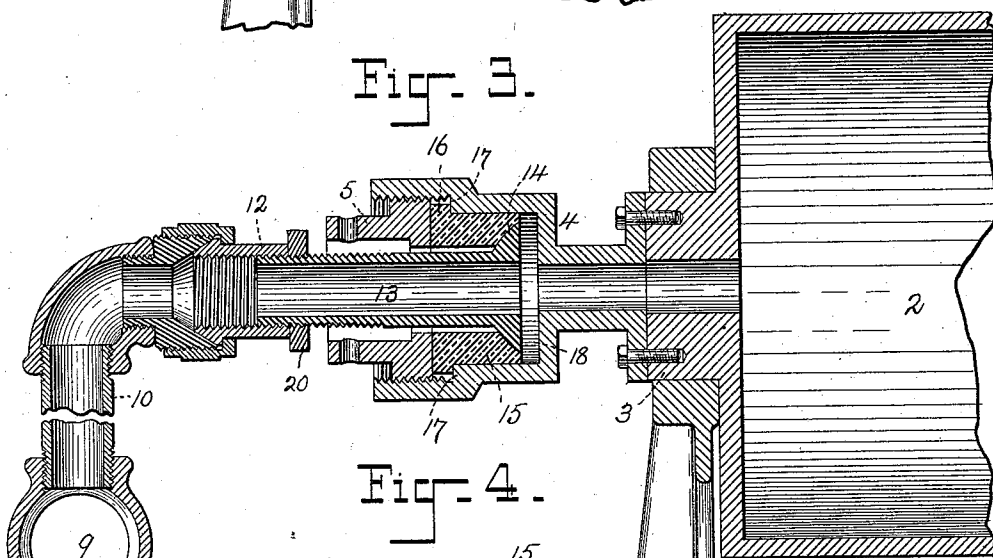
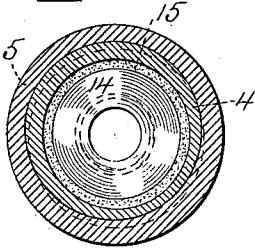


Fig. 4.



Witnesses.

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UNITED STATES PATENT OFFICE.

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WATER-LUBRICATED STEAM-JOINT.

SPECIFICATION forming part of Letters Patent No. 543,046, dated July 23, 1895.

Application filed February 5, 1895. Serial No. 537,353. (No model.)

To all whom it may concern:

Be it known that I, JOHN B. MORGAN, a citizen of the United States, residing at Rockland, in the county of Plymouth and State of Massachusetts, have invented certain new and useful Improvements in Water-Lubricated Steam-Joints; and I do hereby 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 figures of reference marked thereon, which form a part of this specification.

This invention relates to steam-joints and to means for maintaining them tight under peculiar conditions, which require one of the parts to rotate while the other is to remain stationary, and particularly adapted and constructed for use on revoluble steam driers or cylinders. In such instances the steam-tight vessel is to rotate, while the steam supply and discharge pipes are stationary or fixed in position.

My present invention may be considered as relating to and an improvement upon the invention embodied in an application, Serial No. 519,281, now on file in my name at the Patent Office for rotary steam-joints. In steam-joints of this class the peculiar relation of the co-operating parts demands a construction especially adapted for the existing conditions. These include not only adaptability for free contraction and expansion of the various surrounding parts without disturbance of the joint, but also that minimum friction should exist between the parts and still preserve a tight joint; further, in the permanency and durability of the joint when made up, as likewise in the ease with which the joint may be repaired or readjusted in the event of a leakage.

My improvements relate particularly to the arrangement of the parts whereby a chamber is created for condense water and in the peculiar relation of a "flanged tube," so called, with respect to the packing. This packing, which is preferably of wood in the form of a ring, exceeds the diameter of the flange on the tube and is thereby constantly exposed to the action of the condense water, which it is free to absorb, thereby prolonging its wear.

My improvements further relate to the arrangement of the several elements whereby a steam-joint under my invention may be readily attached to driers of all descriptions.

The drawings accompanying this specification represent, in—

Figure 1, a longitudinal sectional elevation of a drier in part, showing a steam-joint embodying my invention applied thereto. Fig. 2 is a similar view, in which a form of attachment is illustrated as modified to connect the joint with driers of old style where smooth journals are employed. In Fig. 1 the attachment of the stuffing-box is internal or concealed, while in Fig. 2 it is external. Fig. 3 is a similar view to that in Fig. 1, showing a slightly-different arrangement of the parts, whereby the steam-joint may be adjusted and rendered tight by the rotation of the drier itself. Fig. 4 is a cross-section on line 1 1 in Fig. 1.

As before premised this invention relates to that class of steam-joints in which some of the elements composing it revolve, while others remain fixed or stationary. In the present instance a revoluble steam-drier is shown at 2 and furnished with journals, one of which is shown at 3, to which is affixed the stuffing-box 4, fitted with an adjustable gland 5. The journal of the drier is bored longitudinally for steam discharge and supply, in the present instance presumably the supply end, and is mounted in a fixed standard 6. Inasmuch as the construction of the steam-joints at both ends of the drier is similar, but one end is shown, and these in Figs. 1, 2, and 3 are all supposed to be in the same relative positions—that is, secured at the front or supply end of the drier. As will be understood from the drawings, the drier, the stuffing-box, its gland, and the packing are all interconnected and revolve continuously, while the steam supply or discharge pipe 9 (not shown) is a stationary element.

In the present instance by reference to Fig. 3 it will be seen that the main steam-pipe is at 9. Usually this pipe extends longitudinally of the drier-stack and is tapped at various points by uprights 10, which lead to the several driers and supply them with steam. The upper extremities of said pipes 10 are fitted with a short length of pipe 12 or inter-

connecting pipe united by a screw-thread engagement with the outer end of a flanged tube 13. This tube is furnished with a check-nut 20, which serves to make the flanged tube a unit with the pipe 12. Hence the tube is a stationary element with the steam-supply pipe and may revolve only at stated times, as will be hereinafter described. Both these screw-threads are to be United States standard threads or a straight thread in contradistinction to an ordinary tapered pipe-thread. The opposite end of said tube 13 terminates in a flange or flared head 14, which is hemispherical or conical in shape, and is adapted to fit and be contained within a corresponding-shaped recess in the packing. This element in the present instance is an annular piece of wood 15, recessed at one end and flanged at the opposite extremity, said flange 16 overlapping a shoulder 17 in the stuffing-box, whereby said packing is forcibly held between the gland and the stuffing-box. In this way the packing is compelled to rotate with the other moving parts, while the flanged tube is held stationary, as before stated.

A peculiar feature of this joint is embodied in the use of wood as a packing, which not only incloses the head 14, of the tube 13, but is of somewhat larger diameter extending beyond the head 14, (see Fig. 4,) and thereby not only prevents contact of metal with metal, but allows the steam to have direct access to the wood. Since this substance is well-known to act as a condenser, a supply of water is constantly maintained in the chamber 18 reserved for this purpose. This chamber, created especially for the reception of condense water, is produced by the interior walls of the stuffing-box conjointly with surfaces of the flange or head 14, and the contiguous portion of the packing which extends circumferentially thereabout. Said chamber may be varied in size, according to the length of the packing or by the amount which it extends into the stuffing-box. Another advantage secured by the exposure of the packing directly to the steam is the absorption of the water by the wood, and in this way the friction produced by the surface contact of the revoluble packing and the stationary pipe is reduced to a minimum. In addition the condensed liquid may gain access directly between the two contact-surfaces and acts as a lubricant.

To provide for irregularities in the proper or direct alignment of the journal-drier with the stationary upright steam-pipe 12, the bores of the packing and gland are both made somewhat larger than the outside diameter of the tube 13. Hence the joint will remain tight, even should lateral divergence occur, since the tube 13 is free to shift on its seat in the packing. Should wear take place in the packing and steam escape between the pipe and packing, adjustment is effected as follows: The check-nut 20 is loosened. The tube 13 is then free to turn, but inasmuch as

I propose to cut the thread in such manner that the said pipe will advance into the steam-pipe 12 as the drier revolves the head 14 is again brought into contact with the packing more and more closely until the joint is rendered perfectly tight. Immediately the nut 20 is turned home, when the tube 13 again becomes a fixture. By cutting a straight thread upon the tube the latter can readily be advanced within the steam-pipe 12 until the packing is completely worn out.

In Fig. 3 the gland is adapted to move interiorly of the stuffing-box, formed with a shouldered neck, which is exteriorly bolted to the journal of the drier. In Figs. 1 and 2 the gland moves exteriorly of the stuffing-box, which in Fig. 1 is interiorly bolted directly to the face of the journal. This is a very effective and neat way of affixing the stuffing-box in place. In Fig. 2 the form of attachment here used is especially adapted where it is desired to apply my form of steam-joint to such driers as have the old style journal with plain necks or without screw-threads. To avoid dismounting said driers, which act would involve expense and loss by disuse of the machine, I provide a capped sleeve 21. The cap of this sleeve is bored to coincide with the bore in the journal, while set-screws 23 unite it rigidly with the journal of the drier. In order to unite the steam-joint with this capped sleeve 21, the latter is exteriorly screw-threaded and is adapted to enter the interiorly screw-threaded portion of the stuffing-box 4', while a gasket 24 is interposed between the meeting surfaces. Thus it will be understood that the only requirement is the additional element in the shape of the capped sleeve, and in this way a very inexpensive method is provided whereby the stuffing-box may be attached to the neck or journal of the drier, whatever may be its construction. In all three illustrations, however, the same elements perform identically the same functions, the interconnecting tubes 13 13' having the same form of attachment to the steam-pipes 12 12' and the same adjustment with respect to the packing.

By means of the above-arranged steam-joint a lubricating-packing is maintained, while friction between the revoluble and non-revoluble parts is minimized. In addition the steam-joint can be tightened by merely loosening the check-nut 20, which will allow rotation of the tube 13 until the leak is stopped, this, it will be understood, without any disturbance of the various co-operating elements. Furthermore, divergence of the alignment occasioned by contraction, expansion, or slight shifting of the revoluble parts due to wear may occur with no disturbance or injury to the steam-joint.

What I claim is—

1. In combination with a revoluble steam cylinder, a stuffing-box affixed to the face of the journal, an adjustable gland, and a flanged packing grasped between the stuffing box and

the gland, an interconnecting flanged tube provided with a head which is contained within the packing, said packing extending circumferentially about the head and interposed between said head and the walls of the stuffing-box, substantially as herein stated.

2. The combination with a rotating steam cylinder, a stuffing-box affixed thereto, its gland, a flanged packing grasped by said box and gland, and a recess at one end of said packing, of a stationary supply pipe, an interconnecting flanged tube having a head at one end to fit the recess in the packing and screw-threaded at the opposite end to engage a fixed pipe, and means to allow said tube to be revolved at times to compensate for the wear of the packing, substantially as described.

3. In combination a cup-shaped stuffing-box having internal holding screws to affix it to a revolving cylinder, a gland, and an annular packing for liquid absorption recessed at one end, an interconnecting tube flanged at one extremity with a straight screw-thread on the opposite end portion, a fixed pipe which engages the screw-thread on the tube, and a check nut to prevent said tube from rotating, substantially as specified.

4. In a steam joint, a cup-shaped stuffing-box, a gland therefor, and an annular packing recessed at one end and grasped between the gland and the stuffing-box, combined

with a tube fitted with a flange to be contained in said recess, the tube and the packing extending in part within said stuffing box and thereby creating a chamber for condense water, substantially as and for purposes explained.

5. In combination with a hollow revoluble vessel, and a stationary flanged tube, a stuffing box which interconnects said cylinder and flanged tube, said stuffing box comprising a short screw-threaded cup, a gland movable upon said screw threads, and an annular packing, the base of said cup being bored for the passage of steam, and adapted for attachment to the journal, substantially as set forth.

6. The combination with a revoluble steam cylinder, a stuffing box affixed thereto, its gland, and an annular packing recessed at one end, of a stationary supply pipe, a tube united at one end with said supply pipe and formed with a head at the opposite end to fit the recess in the packing, the diameter of said tube being less than the bore in said packing to permit rocking movement of said tube, substantially for purposes specified.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN B. MORGAN.

Witnesses:

H. E. LODGE,

E. K. BOYNTON.