

UNITED STATES PATENT OFFICE.

PHIL SHERIDAN TIRRILL, DECEASED, LATE OF MONTPELIER, VERMONT; MAUDE M. TIRRILL, (NOW BY MARRIAGE MAUD M. HEATH,) ADMINISTRATRIX.

PACKING.

998,558.

Specification of Letters Patent. Patented July 18, 1911.

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To all whom it may concern:

Be it known that I, MAUDE M. TIRRILL, am the administratrix of the estate of PHIL SHERIDAN TIRRILL, deceased, who was a citizen of the United States and a resident of Montpelier, in the county of Washington and State of Vermont, and who invented certain new and useful Improvements in Packing, of which the following is a specification.

The invention is an improvement in packing, and consists in certain novel constructions and combinations of parts, hereinafter described and claimed.

The object of the invention is to provide a packing, especially adapted for use with turbine engines, to prevent the escape of steam around the shaft, and also to prevent the entrance of air when the first stage pressure is below the atmospheric pressure, and which will not require any great amount of skill to fit, and when in place will not injure the shaft by cutting.

Referring to the drawings forming a part hereof, Figure 1 is a transverse section through the packing, and Fig. 2 is a longitudinal section.

As is well known, it is extremely difficult to secure a steam tight packing in engines of the character in question, and a preferred form of packing consists in the use of carbon rings. Such rings however require the highest skill in making and fitting, for which reason they are expensive, and in addition they are very liable to damage the shaft by cutting.

Even when fitted in the best possible manner, the rings are unsatisfactory, and the object of the present invention is to dispense with ring packings, and seal the passage by a curtain of liquid encircling the shaft, and arranged between an annular nozzle secured to the casing and a deflecting shield secured to the shaft. With this object in view, I provide an annular casing or nozzle, consisting of an annular angle plate 1, one of whose sides 2 rests against the wheel casing 3, and the other 4 sets close to the shaft 5, but inclined slightly outwardly toward its free edge, the angle between the two sides being somewhat less than a right angle.

The casing is completed by a second annular angle plate 6 whose sides 7 and 8 are arranged at an obtuse angle with respect to each other, and the side 7 rests upon the side

2 of the first plate while the free edge of the side 8 inclines toward the free edge of the side 4 of the first plate, but is spaced apart therefrom to form an annular slot 9.

The plates are secured together and to the wheel casing by cap screws 10, and the cavity formed between the inclined sides of the plates is supplied with a liquid preferably water by a supply pipe 11. The water is applied to the space under pressure and passes out through the slot 9 in an annular continuous stream, which forms a curtain completely encircling the shaft and substantially parallel with the peripheral surface thereof.

The annular plates 1 and 6 are formed in semi-circular sections, whose ends are flanged as at 11, and are secured together by bolts 12. A deflector 13 is secured to the shaft adjacent to the free edges of the sides 4 and 8, the said deflector consisting of a collar whose outer face 14 is beveled, and whose inner face 15 is substantially square as shown in Fig. 1.

The face 15 of the deflector is provided with an annular groove 16, which is substantially semicircular in cross section, and whose inner edge is even with the inner edge of the slot, so that the curtain of liquid soon after it issues from the slot strikes the inner side wall of the groove, and is deflected, following the contour of the groove and reversing its direction of travel, as will be evident from an inspection of Fig. 1.

An annular cap ring 17 encircles the shaft outside of the deflector, and is secured to the wheel casing by cap screws 18, the said cap ring inclosing the deflector and nozzle and forming a shield and receptacle for the liquid, and the liquid is discharged therefrom by means of a discharge pipe 19.

As is well known, water when leaving a nozzle under pressure or "head" is very compact and it is difficult to deflect the particles from the direction of their travel. The deflector is so close to the point of discharge that the particles or molecules have no time to spread or expand, and a practically impervious curtain is thus formed between the shaft, and the wheel casing.

It is obvious that the water must leave the nozzle under sufficient pressure to effectually seal the space between the deflector and nozzle, and it is also obvious that such pressure need not be excessive, since the curtain need

not be of greater length than $\frac{1}{8}$ inch, and a comparatively low pressure will retain the curtain compact through such a short distance.

5 It will be evident that the curtain will be equally efficient against pressure from either side, thus sealing the casing against external as well as internal pressure. The improved packing can be applied to existing turbines without changing the same, and at a low cost. The water may be used continuously, circulating back to the supplying means from the cap ring.

10 While the improved packing has been described as particularly adapted for turbines, it is obvious that it would answer equally as well in any other capacity where it would be necessary to form a fluid tight seal. It is also conceivable that a curtain or other form than an annular one might be desired, in which case the shape of the discharge opening would be changed to correspond.

15 The improvement in its broadest form comprises a nozzle having an elongated discharge opening secured to one of the parts between which the seal is formed, and a deflector in the line of discharge from the nozzle secured to the other of said parts. In the case of a shaft, the deflector might also be dispensed with, the curtain playing directly on the shaft.

20 It will be evident that the nozzle might be connected with the shaft, and the deflector with the casing, the arrangement described however being more simple and hence preferable.

25 It will be evident that a fluid might be used instead of liquid.

Claims:

30 1. The combination with the wheel casing, and the shaft journaled therein and projecting therebeyond, of an annular casing encircling the shaft and secured to the wheel casing and having an annular slot discharging substantially parallel with the peripheral surface of the shaft, means for supplying liquid under pressure to the annular casing, a deflector secured to the shaft adjacent to the annular casing, said deflector having a substantially square face toward the discharge slot, and an annular groove in said face encircling the shaft, the inner edge of the groove being in register with the inner edge of the slot and a cap secured to the wheel casing and inclosing the annular casing and the deflector, and a discharge pipe leading from the cap.

35 2. The combination with the casing and the shaft journaled therein and extending therebeyond, of a nozzle encircling the shaft and secured to the casing, said nozzle having a discharge opening encircling the shaft, means for supplying a liquid under pressure to the nozzle, a deflector comprising a collar secured to the shaft adjacent to the nozzle

and having a substantially flat face on the side toward the nozzle, said face having an annular groove encircling the shaft, the inner edge of the groove registering with the inner edge of the discharge opening of the nozzle, and a cap inclosing the deflector and nozzle and provided with a discharge opening.

3. The combination with the casing and the shaft journaled therein, of a nozzle encircling the shaft and secured to the casing, means for supplying liquid under pressure to the nozzle, said nozzle having a continuous discharge opening encircling the shaft, a collar secured to the shaft close to the nozzle, and having an annular groove encircling the shaft, the inner edge of the groove registering with the inner edge of the discharge opening of the nozzle, and a cap inclosing the deflector and nozzle having a discharge opening.

4. The combination with the casing and the shaft, journaled therein, of an annular nozzle secured to the casing and encircling the shaft, and having a continuous discharge opening encircling the shaft, a collar secured to the shaft adjacent to the nozzle, and having an annular groove whose inner edge registers with the inner edge of the discharge opening of the nozzle, and means inclosing the nozzle, and collar for receiving and discharging the liquid.

5. The combination with the casing and the shaft journaled therein, of an annular nozzle secured to the casing, and encircling the shaft, and having a continuous discharge opening encircling the shaft, a collar secured to the shaft adjacent to the nozzle and having an annular groove whose inner edge registers with the inner edge of the discharge opening of the nozzle.

6. The combination with the casing and the shaft journaled therein, of an annular nozzle having an annular discharge opening encircling the shaft and secured to the casing, a collar secured on the shaft adjacent to the nozzle and having an annular groove whose inner edge registers with the inner edge of the discharge opening.

7. The combination with the casing having an opening, and the shaft extending through the opening, of a collar secured on the shaft adjacent to the casing, and means encircling the shaft and secured to the casing for discharging an annular jet of liquid encircling the shaft against the collar, said collar having means for deflecting the liquid outwardly.

8. The combination with the casing having an opening and the shaft extending therethrough, of a collar on the shaft adjacent to the casing, and means for discharging an annular jet of liquid against the collar, said means being secured to the casing and encircling the shaft.

9. The combination with the casing having an opening and the shaft extending therethrough, of means for discharging an annular jet of liquid, said means encircling the shaft and being secured to the casing, and means on the shaft adjacent to the casing for engaging and deflecting said jet outwardly.

10. The combination with the shaft, and the casing through which it extends, of means secured to the casing for discharging an annular jet of liquid longitudinally of the shaft and encircling the same, and means on the shaft for engaging and deflecting the liquid.

11. The combination with the shaft and the casing through which it extends, of means for discharging an annular jet of fluid lon-

gitudinally of the shaft and encircling the same and means for engaging and deflecting the jet laterally, one of the said means being secured to the shaft and the other to the casing.

12. The combination with the shaft and the casing through which it extends, of means for forming a curtain of fluid under pressure encircling the shaft and between the shaft and the casing and longitudinally on the said shaft.

MAUDE MONTGOMERY TIRRELL,

Administratrix of the estate of Phil Sheridan Tirrill, deceased.

Witnesses:

W. J. DALTON,
S. W. CUSHING.

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