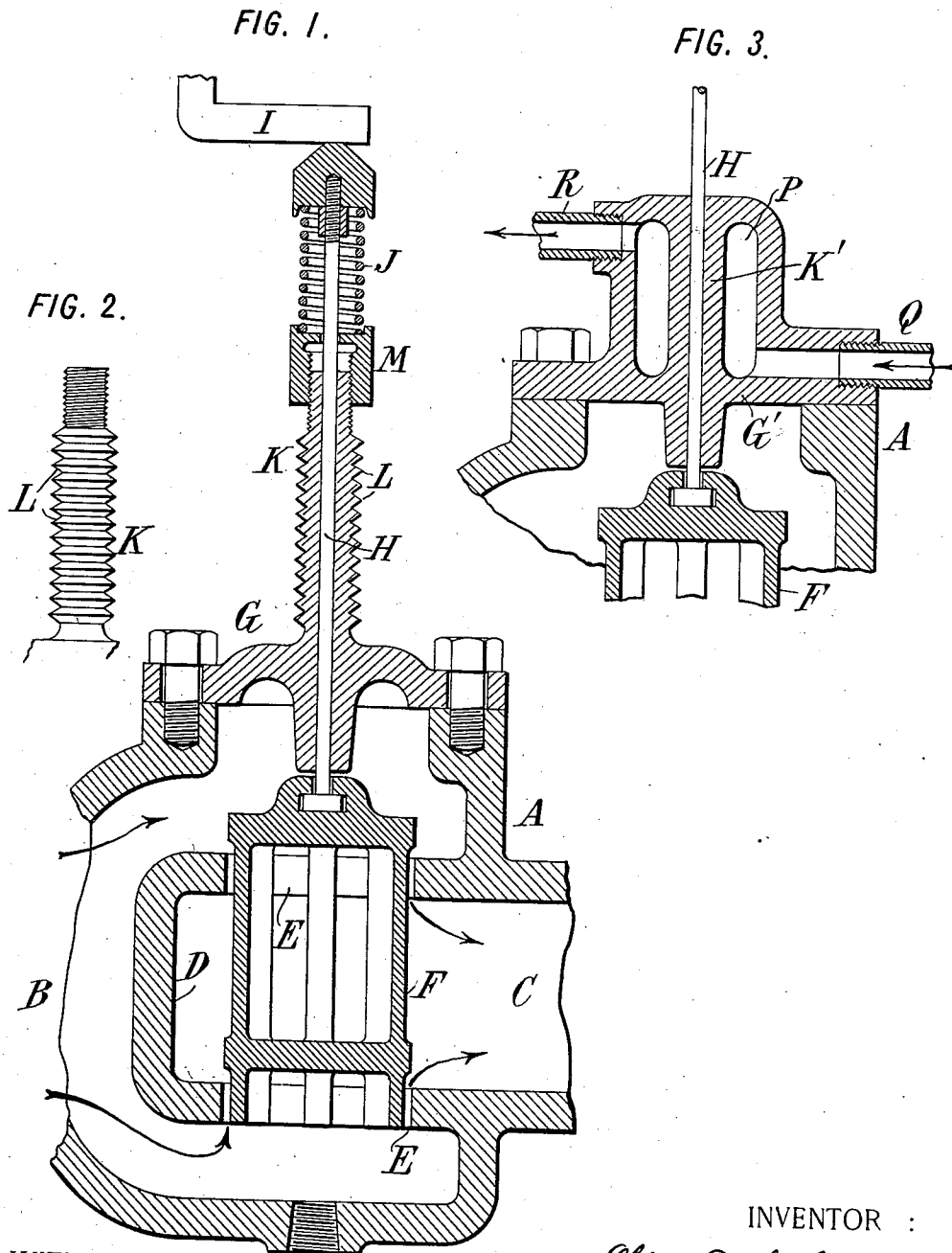


O. D. H. BENTLEY.
 ROD STEAM PACKING.
 APPLICATION FILED JUNE 15, 1909.

935,955.

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WITNESSES:
Frederick White
Rene Gruene

INVENTOR :
Oliver D. H. Bentley,
 By Attorneys
Arthur C. Kaiser & Hanna

UNITED STATES PATENT OFFICE.

OLIVER D. H. BENTLEY, OF NEW YORK, N. Y., ASSIGNOR TO E. W. BLISS COMPANY, OF BROOKLYN, NEW YORK, A CORPORATION OF WEST VIRGINIA.

ROD STEAM-PACKING.

935,955.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, OLIVER D. H. BENTLEY, a citizen of the United States, residing in the borough of Brooklyn, county of Kings, city and State of New York, have invented certain new and useful Improvements in Rod Steam-Packing, of which the following is a specification.

This invention relates to a packing for piston rods, valve rods or the like, used in connection with steam engines, throttle valves, and elsewhere where steam is the fluid to be packed against.

According to this invention the rod is carried from the inner or steam chamber to the exterior, through a close-fitting bore formed in a suitable neck, the fit being a close working fit, so that while the rod may easily move through the bore, yet the intervening space is so thin as to preclude any but an extremely minute leakage of steam. Provision is made for insuring the condensation of the minute quantity of steam which can leak into this narrow space. For this purpose the neck through which the rod or stem emerges is fluted, corrugated, or otherwise disposed upon its exterior so as to afford a considerable radiating surface whereby to cause a sufficiently rapid cooling of the neck; or, where practicable, the neck is formed with a jacket or passage through or surrounding it, for the circulation of a cooling fluid. By thus causing the condensation of the minute quantity of steam which can enter a contracted space or clearance between the rod and bore, this space is so effectually packed as to exclude all leakage except a quantity so minute as to be negligible.

Figure 1 of the accompanying drawings shows my invention as applied to a throttle valve or governor valve for a steam turbine or other form of steam engine, the view being a vertical mid-section. Fig. 2 is a fragmentary elevation of the neck portion of the structure shown in Fig. 1. Fig. 3 is a fragmentary section showing a modification.

Referring to Fig. 1, A is a casing or shell in which steam is admitted at B, and from which it escapes at C, the shell being formed between with a partition D dividing it into two chambers which communicate through openings or steam ports E E, in which works a balanced valve F of a well known construction. The top of the shell A is closed by a cap or cover G. The valve rod H

passes out through this cap, and its upper end may be connected with any operating means such, for example, as a lever I and a spring J by which to raise and lower the rod, and thereby operate the valve. So far as described this is a common and well known construction.

Instead of providing a stuffing-box, or other common form of packing for the rod H, I construct the cap G with a suitably prolonged neck K, and through this long neck is formed a bore which makes a very close working fit with the rod H. The area of the space or clearance between the rod and bore is reduced to the minimum, not only by the closeness of their fit, but also by making the rod of as small diameter as is practicable. The neck K is sufficiently long to insure the condensation of the minute quantity of steam which can leak into this clearance. To insure this condensation the neck is formed exteriorly with a succession of projections, either in the form of concentric ribs L L as shown, or in any other manner whereby the exterior surface of the neck which is in contact with the air, is so increased as to sufficiently promote the radiation of heat, and thereby insure the condensation of steam in the leakage space or clearance around the rod. It results from this construction that the infinitesimal quantity of steam which can enter this clearance is necessarily condensed therein, and the weight of the condensation water opposes itself to the upward leakage of the steam. The condensation water is very slowly formed, and slowly works its way upward through the clearance space, so that at considerable intervals a drop of water is discharged at the top.

In Figs. 1 and 2 the upper end of the neck is shown as screw-threaded to receive an adjustable nut M, whereby to vary the tension of the spring J; but this forms no part of the present invention.

Referring to Fig. 3, the shell A, the valve F and the rod H are of the same construction as shown in Fig. 1; but the cap G' is modified, its neck K' being made shorter, and instead of its exterior being exposed to the atmosphere for the radiation of heat, it is formed with a jacket P surrounding it (preferably as shown by coring out this jacket in the same casting), and provision is made for causing a circulation of cooling

fluid through this jacket P. For this purpose an admission pipe Q and a discharge pipe R, are provided. The cooling fluid may be water or air under suitable pressure, or any other suitable or convenient fluid. The length of the jacket P of the neck K' should be suitably proportioned with respect to the efficiency of the cooling medium, a very short neck and jacket being admissible when cold water is used, and a longer one being required where warmer water or where air, is used. The length of the jackets should also be proportioned to the rapidity of circulation of the cooling medium, this being an element in determining its efficiency. When a given length of neck and size of jacket has been determined upon, the cooling medium must thereafter be maintained of suitable efficiency to cause the condensation to take place at a desirably rapid rate.

It is important to have the rod or stem extend vertically or nearly so to the packing, the steam chamber being located beneath, so that the gravitation of the condensation water is rendered effective in resisting leakage.

I claim as my invention:—

1. A steam packing, comprising a neck between the steam chamber and the exterior, and a slender rod passing through said neck, the neck being bored to a close working fit with the rod, and being of sufficient length to insure the condensation of any steam leaking into the minute clearance space between the rod and bore whereby without other packing means the condensation in said space affords a sufficient obstruction to the escape of steam.

2. A steam packing, comprising a neck projecting upwardly from the steam chamber to the exterior, and a slender upright

rod passing through said neck, the neck being bored to a close working fit with the rod, and being of sufficient length to insure the condensation of any steam leaking into the minute clearance space between the rod and bore whereby without other packing means the condensation in said space affords a sufficient obstruction to the escape of steam, and whereby the gravitation of said condensation is utilized to oppose leakage.

3. A steam packing, comprising a neck between the steam chamber and the exterior, and a rod passing through said neck, the neck being bored to a close working fit with the rod, and provided with means adapted to promote radiation of heat in the neck, to insure the condensation of any steam leaking into the minute clearance space between the rod and bore whereby without other packing means the condensation in said space affords a sufficient obstruction to the escape of steam.

4. A steam packing, comprising a neck between the steam chamber and the exterior, and a rod passing through said neck, the neck being bored to a close working fit with the rod, and provided with external projections adapted to promote radiation of heat to the atmosphere, to insure the condensation of any steam leaking into the minute clearance space between the rod and bore whereby without other packing means the condensation in said space affords a sufficient obstruction to the escape of steam.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

OLIVER D. H. BENTLEY.

Witnesses:

EDWIN G. KNAPP,
ARCHIE S. McLUNDIE.