

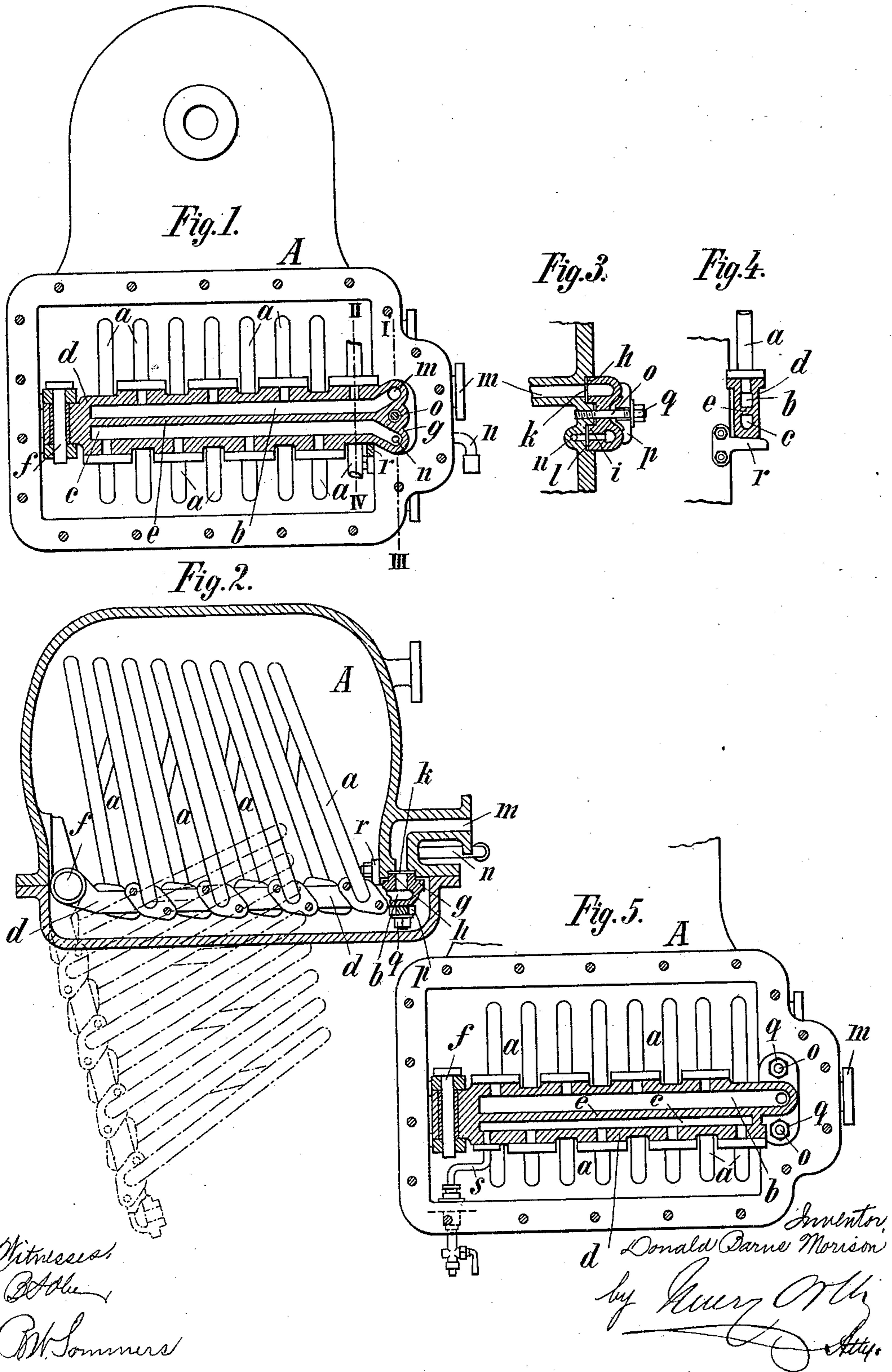
No. 685,482.

Patented Oct. 29, 1901.

D. B. MORISON.
EVAPORATOR.

(Application filed Feb. 25, 1901.)

(No Model.)



UNITED STATES PATENT OFFICE.

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EVAPORATOR.

SPECIFICATION forming part of Letters Patent No. 685,482, dated October 29, 1901.

Application filed February 25, 1901. Serial No. 48,743. (No model.)

To all whom it may concern:

Be it known that I, DONALD BARNS MORISON, a subject of the King of Great Britain and Ireland, residing at Hartlepool, in the county of Durham, England, have invented new and useful Improvements in Evaporators, of which the following is a specification.

In the already-known evaporators with heating-coils capable of being withdrawn radially from the interior of the apparatus to a position outside, the connection of the heating-coils with the steam-inlet and water-discharge passages, respectively, is effected or established by the aid of hollow pivots or trunnions on which the body of heating-coils is hinged by means of suitable tubes closed at one end and connecting the separate heating-coils with one another. In this construction the steam-supply and the discharge of the condensed water, respectively, take place through the said hollow trunnions on which the heating-coil system is hinged. It is obvious and practical experience has shown that such an arrangement is disadvantageous for the reason that the steam-trunnions are difficult to keep tight on account of the weight of the overhanging coils and also because the scale which accumulates on their outer surfaces has to be removed before the coils can be radiated. These disadvantages are obviated by the present invention, and the purpose or object aimed at is thereby attained—that the heating-coil body is attached to the evaporator-casing by means of an ordinary hinge-joint, the connection of the heating-coil body with the steam-inlet and water-outlet, respectively, however, being effected by means of a spigot-and-faucet joint, flange-joint, &c., which insures a perfect steam-tight connection and dispenses with the removal of the scale before the withdrawal of the heating-coil body.

My improved arrangement is exceedingly simple in construction and convenient in use.

In the accompanying drawings, forming part of this specification, and in which similar letters of reference indicate like parts, Figure 1 is a front elevation of an evaporator containing a heating-coil body embodying my invention, the heating-coil body and its joints being shown in vertical longitudinal

section. Fig. 2 is a sectional plan of Fig. 1. Fig. 3 is a cross-section on the line I III, Fig. 1. Fig. 4 is a cross-section on the line II IV, Fig. 2. Fig. 5 is a similar view to Fig. 1, showing a modification of the heating-coil-body joint.

As the example represented in the accompanying drawings shows, the separate heating-coils *a* are connected to a supply tube or channel *b* and a discharge tube or channel *c* in one rigid girder-like casting *d*. The channels *b* and *c*, separated from each other by a partition *e*, are closed at one end of the casting. At this end the casting *d* is connected or attached to the casing *A* of the evaporator by means of a suitable hinge-joint *f*. The tubes or channels *c* and *b* of the casting *d* at the free end terminate in a palm-flange *g* of special construction and arranged with spigots or necks *h* and *i*, adapted to fit into corresponding recesses or faucets *k* and *l* of the steam-supply passage *m* and the discharge-passage *n* for the condensing water, both passages being arranged in a convenient manner in the wall of the evaporator-casing. When the heating-coil body on the casting *d*, respectively, is turned into the evaporator, the flange *g* slides with a hole on a bolt or stud *o*, while the spigots *h* and *i* enter into the faucets *k* and *l*, respectively, thereby forming a spigot-and-faucet joint, which may be secured and tightened by means of a girder *p* and a nut *q*, as shown in the drawings. Suitable packing-rings may be employed, if required, to insure absolute steam-tightness.

In order to withdraw or turn the heating-coil body into an outside position for inspection or cleaning, it is only necessary to unscrew after the removal of the cover *B* of the evaporator the nut *q* and to remove the same and the girder *p* and then to swing out the heating-coil body. In the same easy manner the connection may again be performed by swinging the heating-coil body into the evaporator and in position, respectively, and then by tightening the thus-established spigot-and-faucet joint by putting on the girder *p* and screwing home the nut *q*. The joint is thus effectively made with a minimum of bolts and with a minimum of room, both being features of importance in view of the frequency with which the tubes require cleaning.

In order to support the heating-coil body, I arrange at the palm-jointed end of the apparatus and underneath the casting *d* a bracket *r*, with an inclined path, so that on the heating-coil body being radiated into the interior of the casing the hinged heating-coil body is supported by the bracket *r* and guided on the inclined path, thus insuring that the palm-joint is always accurately placed, notwithstanding the frequency with which the heating-coils are removed for purpose of cleaning.

In the modification shown by Fig. 5 only the steam-channel *b* is connected to the steam-supply passage by a spigot-and-faucet joint, while the channel *c* is closed at both ends and the discharge of the condensed water effected by means of a suitable discharge-pipe *s*, adapted and arranged not to interfere with the swinging or turning of the heating-coil body. In this modification the joint is tightened or strengthened by outer bolts *o*, fitting through or arranged in upper and lower extensions or lugs of the palm.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination with an evaporating vessel provided with fluid inlet and outlet passages and with a normally-closed opening; of a heating-coil pivotally connected with said vessel, and having fluid inlet and outlet passages and adapted to swing out of and into register with the corresponding passages in the vessel when said coil is swung through the aforesaid opening and back again into the vessel, for the purpose set forth.

2. The combination with an evaporating vessel provided with fluid inlet and outlet passages and with a normally-closed opening; of a heating-coil pivotally connected with said vessel and having fluid inlet and outlet passages adapted to swing out of and into register with the corresponding passages in the vessel when said coil is swung through the aforesaid opening and back again into the vessel, and means for supporting the free end of the coil, for the purpose set forth.

3. The combination with an evaporating vessel provided with an opening normally closed by a cover and with fluid-tight inlet and outlet passages terminating in a socket; of a hollow casting having two passages therein open at one end, coils connecting the passages, a hinge at the solid portion of said casting at one end, said casting arranged to be swung to bring the open ends of said passages opposite the hinge into register with and fit the socket of the fluid-tight inlet and outlet passages, substantially as set forth.

4. The combination with an evaporating

vessel provided with an opening normally closed by a cover and with fluid-tight inlet and outlet passages terminating in a socket; of a hollow casting divided into two passages open at one end, coils connecting the passages, a guiding and supporting bracket, a hinge at the end of said casting through the solid portion thereof and opposite the open ends of said chambers, said casting arranged to be swung on the hinge to allow the free end to ride on said bracket and the respective passages therein to register with and fit the sockets of the fluid-tight inlet and outlet passages.

5. The combination with an evaporating vessel provided with an opening, normally closed by a cover, and with a fluid-inlet passage terminating in a socket-seat; of a heating-coil pivoted within the vessel to swing through said opening when the cover is removed and having a fluid-inlet fitting the aforesaid socket-seat, the arrangement being such as to cause the coil-inlet to move into and out of the aforesaid socket-seat when said coil is swung into and out of the casing, and a suitable fluid-outlet for said coil so arranged as not to interfere with its swinging movements, for the purpose set forth.

6. The combination with an evaporating vessel provided with an opening, normally closed by a cover, and with fluid inlet and outlet passages terminating within the vessel in socket-seats; of a heating-coil pivoted within the vessel to swing out of said opening when the cover is removed, said coil having plug-like terminals fitting the aforesaid socket-seats, the arrangement being such as to cause said terminals to move out of and into their respective socket-seats when the coil is swung out of and into the casing, for the purpose set forth.

7. The combination with an evaporating vessel provided with a normally-closed opening and with fluid inlet and outlet passages; of a heating-coil, a carrier therefor hinged to the vessel to swing through the aforesaid opening, and provided with internal inlet and outlet passages in communication with the coil, said passages open at the free end of the carrier and adapted to be connected fluid-tight with the corresponding passages in the vessel, a stationary guide guiding said free end of the carrier to connect its inlet and outlet passages with the corresponding passages in the vessel, and means for locking the carrier into operative position, substantially as and for the purpose set forth.

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Witnesses:

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