Oct. 10, 1939. F. N. TRIER ET AL 2,175,652

APPARATUS FOR DELIVERING LIQUID OR SEMILIQUID SUBSTANCES

Filed March 6, 1939 2 Sheets-Sheet 1

Fig. 1.

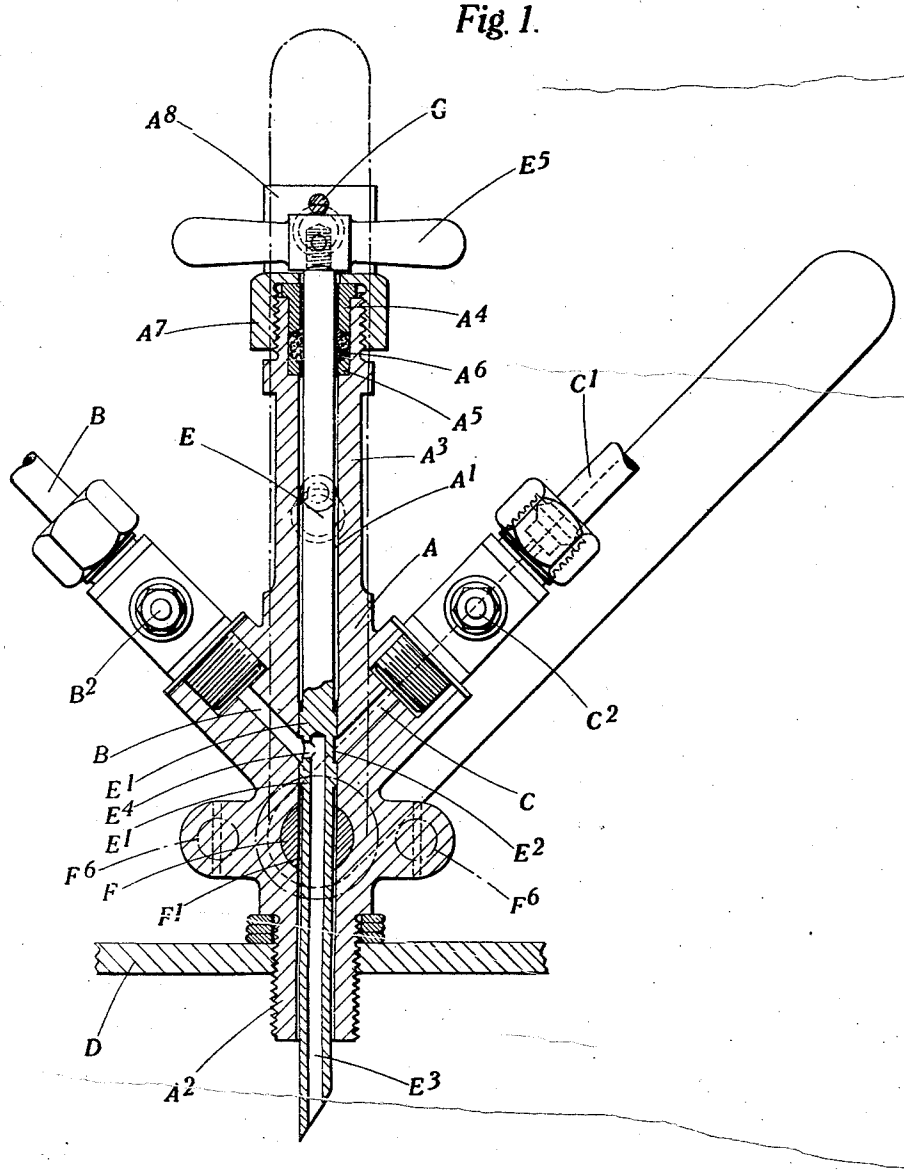

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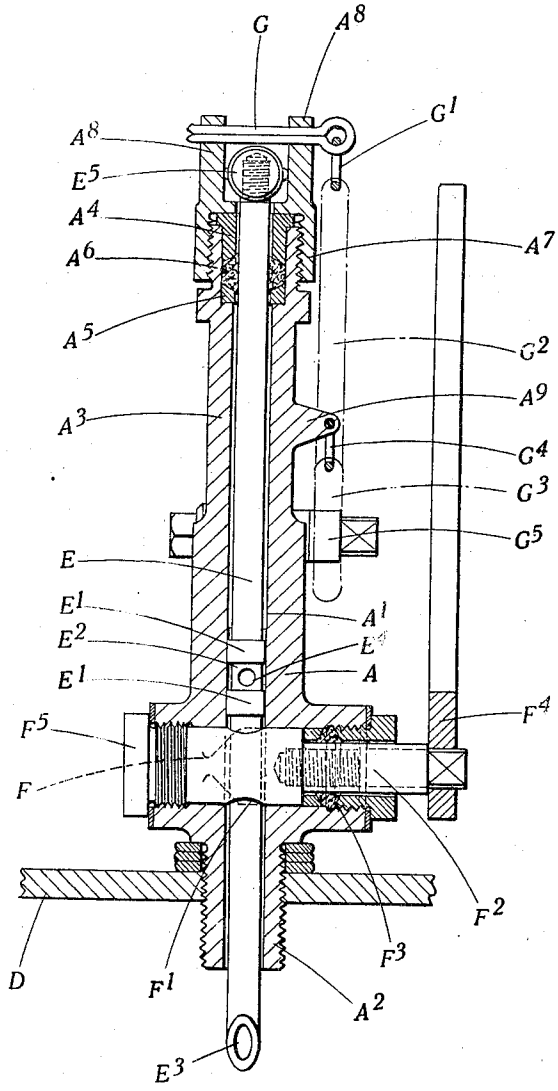
Fig. 2.



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APPARATUS FOR DELIVERING LIQUID OR SEMILIQUID SUBSTANCES

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12 Claims. (Cl. 137—69)

This invention relates to apparatus of the kind comprising inlet and delivery passages adapted to deliver into hot fluids, for example steam, either liquid or semi-liquid substances, that is to say substances in the nature of a liquid with or without solid material in colloidal or other suspension therein, grease, powder and other like substances and has particular reference to apparatus of the above kind for delivering liquid or semi-liquid substances which tend to be affected by heat transmitted to the substance in the delivery passage from the hot fluid in a manner liable to cause choking of the delivery passage.

Apparatus of the above kind according to the present invention, comprises a casing or body part containing an inlet passage and a delivery bore, a rod-like member which normally lies within the delivery bore but can be withdrawn from the casing when desired and is formed with a passage constituting the delivery passage when in its normal position and a valve for closing the delivery bore when the rod-like member is partially withdrawn from the casing and prior to total withdrawal thereof for cleaning purposes.

The valve is conveniently of the rotary plug type having a transverse bore through which the rod-like member normally passes, stops conveniently being provided for the valve or the lever for operating it to determine respectively the open and closed position of the valve.

The delivery passage in the rod-like member is preferably in the form of an axially extending bore opening at one end (hereinafter termed the lower end) through the end of the rod-like member and communicating at its upper end with the inlet passage when the rod-like member is in its normal position.

Further the rod-like member and the casing are conveniently provided with parts cooperating to act as a stop which permits the necessary partial withdrawal of the rod-like member so that the valve can be closed but prevents total withdrawal until some further operation has been carried out. Thus in a simple arrangement the cooperating parts which act as a stop comprise a shoulder on the rod and the end of a sleeve surrounding the rod and normally rigid with but capable of being removed from the casing with the rod to permit total withdrawal of the rod. In such an arrangement, the sleeve conveniently constitutes part of a gland through which the rod passes while the shoulder on the rod is constituted by the upper end of a piston-like part of the rod which fits closely within the bore in the casing and through which the radial passage in the rod extends so that this piston-like part forms a substantially fluid-tight seal between the rod and the bore in the casing above and below the point where the radial passage in the rod communicates with the inlet passage in the casing. In order to ensure that the inlet passage and the radial passage will communicate irrespective of the rotational position of the rod, in such an arrangement a circumferential recess may be formed in the rod in the plane of the radial passage therein.

In some cases interlocking means might be provided which prevent removal of the sleeve or other stop member from the casing until the valve has been closed so as to prevent total withdrawal of the rod with the valve open.

In any case one or more additional passages or openings may be provided in the casing the inner ends of which communicate with the delivery passage to enable a flow of fluid for cleaning purposes to be established through the delivery passage and the additional passage or each additional passage independently of the inlet passage. Thus, by opening the additional passage to the atmosphere, steam or other hot fluid into which the liquid or semi-liquid substance is adapted to be delivered can flow through the delivery and additional passages to the atmosphere to constitute the cleaning fluid or alternatively a separate cleaning fluid can be forced via the additional passage through the delivery passage from outside the casing. The flow of cleaning fluid may serve to clean the delivery passage or bore in the rod from time to time between periodic removals of the rod from the casing for more complete cleaning or the removal of material which cannot be removed by the mere passage of cleaning fluid therethrough.

The invention may be carried into practice in various ways but one construction according to the invention is illustrated by way of example in the accompanying drawings, in which

Figure 1 is a sectional front elevation in a plane containing the axis of the apparatus, and

Figure 2 is a sectional side elevation of the construction shown in Figure 1.

In the construction illustrated the apparatus comprises a casing A having an inlet passage B adapted to be connected through a pipe B^1 controlled by a cock B^2 with a source of supply of the substance to be delivered, and an additional passage C adapted to be connected through a pipe C^1 controlled by a cock C^2 either with the atmosphere or with a source of supply of cleaning fluid.

The passages B and C lead into opposite sides of a bore A^1 in the casing A one end of which passes through an externally screwthreaded boss A^2 on the casing A adapted to be screwed into a pipe indicated at D through which flows the fluid to which the substance is to be delivered, while its other end extends through the outer end A^3 of the casing as shown. Mounted to slide in the bore A^1 is a rod E of somewhat smaller diameter than the bore except for a part E^1 which when the rod is in its normal position as shown lies opposite the inner ends of the passages B and C and is provided with an annular recess E^2. The outer end of the rod E passes through a stuffing box comprising two rings A^4, A^5 between which a ring of packing material A^6 is compressed by a screwthreaded collar A^7 engaging the outer end of the casing and bearing on the ring A^4.

The inner end of the rod E is formed tubular so as to provide a delivery passage E^3 which opens through the inner end of the rod E and communicates through one or more radial ports E^4 with the annular recess E^2.

Extending across the bore A^1 at a point between the passages B and C and the inner end thereof is a rotary valve F having a bore F^1 through which the rod E can pass when the valve occupies the appropriate position. The valve is arranged to be operated manually from outside the casing through a spindle F^2 secured to the valve and passing through a stuffing box F^3, the outer end of the spindle being squared or otherwise formed to receive a handle F^4.

The valve F and the bore in which it lies are conveniently somewhat tapered so as to enable the valve readily to be freed should it tend to stick, and the end of the bore in which the valve lies remote from the spindle F^2 is closed by a plug F^5.

Stops indicated at F^6 may also be provided to limit the movement of the handle and ensure that in its two limiting positions the valve is respectively in the position shown and fully closed. A groove may also be provided in the end of the spindle F^2 to indicate the position of the bore F^1.

The rod E is provided with a handle E^5 at its upper end and is normally held in the position shown by a pin G passing through holes in two parallel lugs A^8 on the collar A^7. A safety device is provided for preventing unintentional withdrawal of the pin G comprising a ring G^1 passing through the eye of the pin G and connected by a chain G^2 to a member G^3 which is pivotally connected to a link G^4 pivoted to a lug A^9 on the casing and adapted to act as a toggle. The member G^3 is slotted to pass over a rotatable pin G^5 which is formed so that when then rotated it locks the member G^3 in position thereon so that the parts are retained in the position shown. The pin G^5 is adapted to be rotated by a removable handle, for example the handle F^4, and when moved to release the member G^3 permits the toggle G^4 to be swung outwards to loosen the chain G^2 and thus enable the pin G to be withdrawn.

It will be seen that with the apparatus shown, the substance is normally fed through the pipe B^1, passage B, port E^4 and bore E^3 to the interior of the pipe D, the cock C^2 being closed.

From time to time if desired the cock C^2 can be opened and if, as is generally desirable when the pipe D is a superheated steam pipe, the pipe C^1 is connected to the atmosphere, this enables superheated steam to blow through the bore E^3 and port E^4 for cleaning purposes, the cock B^2 preferably being closed during this operation. In this way blocking of the bore E^3 tends to be prevented.

If, however, a more thorough cleaning is desired or becomes necessary, the pin G is withdrawn and the rod E is permitted to slide outwards until its inner end has passed the valve F whereupon this valve is closed. Unintentional sliding of the rod E right out of the casing A is prevented by the upper edge of the part E^1 meeting the stuffing box. After closing the valve F, the stuffing box A^4, A^5, A^6, A^7 can be dismantled and the rod E completely withdrawn, the bore E^3 and port E^4 cleaned and the rod and stuffing box reassembled. The valve F is then opened and the rod E moved into its original position and the pin G replaced. With this arrangement it will be seen that unscrewing of the collar A^7 to dismantle the stuffing box cannot be effected until the pin G has been withdrawn to permit the rod E to move to its partially withdrawn position. Thus risk of the stuffing box being dismantled before the rod E has been partly withdrawn and the valve F closed is reduced.

It is to be understood that the construction more particularly described above is given by way of example only and that the construction may vary within the scope of the appended claims without departing from this invention.

What we claim as our invention and desire to secure by Letters Patent is:

1. Apparatus for delivering into hot fluids, liquid or semi-liquid substances comprising a casing which is adapted to be connected to the apparatus containing the hot fluid and contains an inlet passage and a delivery bore out of line with but communicating with the inlet passage, a rod-like member extending through the delivery bore and through a bore in line therewith through which the rod-like member can be withdrawn from the casing and provided with a delivery passage which communicates with the inlet passage when the rod-like member is in its normal position, and a valve for closing the delivery bore when the rod-like member is partially withdrawn and prior to total withdrawal for cleaning of the rod-like member.

2. Apparatus for delivering into hot fluids, liquid or semi-liquid substances comprising a casing which is adapted to be connected to the apparatus containing the hot fluid and contains an inlet passage and a delivery bore out of line with but communicating with the inlet passage, a rod-like member extending through the delivery bore and through a bore in line therewith through which the rod-like member can be withdrawn from the casing and provided with a delivery passage which communicates with the inlet passage when the rod-like member is in its normal position, and a manually operated rotary valve extending across the delivery bore and having a passage through it which, by rotation of the valve, can be brought into line with the delivery bore to permit the rod-like member to pass therethrough or can be moved out of communication with the delivery bore so as to close this bore when the rod-like member has been withdrawn therefrom.

3. Apparatus for delivering into hot fluids, liquid or semi-liquid substances comprising a casing which is adapted to be connected to the apparatus containing the hot fluid and contains an inlet passage and a delivery bore out of

line but communicating with the inlet passage, a rod-like member extending through the delivery bore and through a bore in line therewith through which the rod-like member can be withdrawn from the casing, the part of the rod-like member which extends through the delivery bore being formed hollow and provided with at least one radial port communicating with the inlet passage when the rod-like member is in its normal position, and a valve for closing the delivery bore when the rod-like member is partially withdrawn and prior to total withdrawal thereof for cleaning purposes.

4. Apparatus for delivering into hot fluids, liquid or semi-liquid substances comprising a casing which is adapted to be connected to the apparatus containing the hot fluid and contains an inlet passage and a delivery bore out of line but communicating with the inlet passage, a rod-like member extending through the delivery bore and through a bore in line therewith through which the rod-like member can be withdrawn from the casing, the part of the rod-like member which extends through the delivery bore being formed hollow and provided with at least one radial port communicating with the inlet passage when the rod-like member is in its normal position, and a manually operated rotary valve extending across the delivery bore and having a passage through it which, by rotation of the valve, can be brought into line with the delivery bore to permit the rod-like member to pass therethrough or can be moved out of communication with the delivery bore so as to close this bore when the rod-like member has been withdrawn therefrom.

5. Apparatus for delivering into hot fluids, liquid or semi-liquid substances comprising a casing which is adapted to be connected to the apparatus containing the hot fluid and contains an inlet passage and a delivery bore out of line but communicating with the inlet passage, a rod-like member extending through the delivery bore and through a bore in line therewith through which the rod-like member can be withdrawn from the casing, the part of the rod-like member which extends through the delivery bore being formed hollow and provided with at least one radial port communicating with the inlet passage when the rod-like member is in its normal position, and a valve for closing the delivery bore when the rod-like member is partially withdrawn and prior to total withdrawal thereof for cleaning purposes, the rod-like member being of smaller diameter than the delivery bore except for parts immediately on each side of the part in which the radial port is formed.

6. Apparatus for delivering into hot fluids, liquid or semi-liquid substances comprising a casing which is adapted to be connected to the apparatus containing the hot fluid and contains an inlet passage and a delivery bore out of line but communicating with the inlet passage, a rod-like member extending through the delivery bore and through a bore in line therewith through which the rod-like member can be withdrawn from the casing, the part of the rod-like member which extends through the delivery bore being formed hollow and provided with at least one radial port communicating with the inlet passage when the rod is in its normal position, and a manually operated rotary valve extending across the delivery bore and having a passage through it which, by rotation of the valve, can be brought into line with the delivery bore to permit the rod-like member to pass therethrough or can be moved out of communication with the delivery bore so as to close this bore when the rod-like member has been withdrawn therefrom, the rod-like member being of smaller diameter than the delivery bore except for parts immediately on each side of the part in which the radial port is formed.

7. Apparatus for delivering into hot fluids, liquid or semi-liquid substances comprising a casing which is adapted to be connected to the apparatus containing the hot fluid and contains an inlet passage and a delivery bore out of line with but communicating with the inlet passage, a rod-like member extending through the delivery bore and through a bore in line therewith through which the rod-like member can be withdrawn from the casing and provided with a delivery passage which communicates with the inlet passage when the rod-like member is in its normal position, a valve for closing the delivery bore when the rod-like member is partially withdrawn and prior to total withdrawal for cleaning of the rod-like member, an additional passage communicating with the delivery bore at the same point as the inlet passage, and a valve controlling the additional passage.

8. Apparatus for delivering into hot fluids, liquid or semi-liquid substances comprising a casing which is adapted to be connected to the apparatus containing the hot fluid and contains an inlet passage and a delivery bore out of line but communicating with the inlet passage, a rod-like member extending through the delivery bore and through a bore in line therewith through which the rod-like member can be withdrawn from the casing, the part of the rod-like member which extends through the delivery bore being formed hollow and provided with at least one radial port communicating with the inlet passage when the rod is in its normal position, a valve for closing the delivery bore when the rod-like member is partially withdrawn and prior to total withdrawal thereof for cleaning purposes, an additional passage communicating with the delivery bore at the same point as the inlet passage, and a valve controlling the additional passage.

9. Apparatus for delivering into hot fluids, liquid or semi-liquid substances comprising a casing which is adapted to be connected to the apparatus containing the hot fluid and contains an inlet passage and a delivery bore out of line but communicating with the inlet passage, a rod-like member extending through the delivery bore and through a bore in line therewith through which the rod-like member can be withdrawn from the casing, the part of the rod-like member which extends through the delivery bore being formed hollow and provided with at least one radial port communicating with the inlet passage when the rod-like member is in its normal position, a valve for closing the delivery bore when the rod-like member is partially withdrawn and prior to total withdrawal thereof for cleaning purposes, the rod being of smaller diameter than the delivery bore except for parts immediately on each side of the part in which the radial port is formed, an additional passage communicating with the delivery bore at the same point as the inlet passage, and a valve controlling the additional passage.

10. Apparatus for delivering into hot fluids, liquid or semi-liquid substances comprising a casing which is adapted to be connected to the apparatus containing the hot fluid and contains an inlet passage and a delivery bore out of line with but communicating with the inlet passage,

a rod-like member extending through the delivery bore and through a bore in line therewith through which the rod-like member can be withdrawn from the casing and provided with a delivery passage which communicates with the inlet passage when the rod-like member is in its normal position, a valve for closing the delivery bore when the rod-like member is partially withdrawn and prior to total withdrawal for cleaning of the rod-like member, removable means for normally retaining the rod-like member in its normal position, and separate removable means for retaining the rod-like member in its partly withdrawn position.

11. Apparatus for delivering into hot fluids, liquid or semi-liquid substances comprising a casing which is adapted to be connected to the apparatus containing the hot fluid and contains an inlet passage and a delivery bore out of line with but communicating with the inlet passage, a rod-like member extending through the delivery bore and through a bore in line therewith through which the rod-like member can be withdrawn and provided with a delivery passage which communicates with the inlet passage when the rod-like member is in its normal position, a valve for closing the delivery bore when the rod-like member is partially withdrawn and prior to total withdrawal for cleaning of the rod-like member, first removable means for normally retaining the rod-like member in its normal position, separate second removable means for retaining the rod-like member in its partly withdrawn position, and means whereby the second removable means cannot be removed to permit total withdrawal of the rod until the first removable means have been removed.

12. Apparatus for delivering into hot fluids, liquid or semi-liquid substances comprising a casing which is adapted to be connected to the apparatus containing the hot fluid and contains an inlet passage and a delivery bore out of line with but communicating with the inlet passage, a rod-like member extending through the delivery bore and through a bore in line therewith through which the rod-like member can be withdrawn from the casing and provided with a delivery passage which communicates with the inlet passage when the rod-like member is in its normal position, a manually operated rotary valve for closing the delivery bore when the rod-like member is partially withdrawn and prior to total withdrawal for cleaning of the rod-like member, a stuffing box through which the rod-like member slides as it is partially withdrawn and which has to be dismantled to permit total withdrawal of the rod, projections or lugs on the stuffing box between which the end of the rod is adapted to lie when in its normal position, a removable pin extending through holes in these projections to retain the rod normally in its normal position, and means for connecting the pin to the casing so that the stuffing box cannot be dismantled until the pin has been removed to permit partial withdrawal of the rod.

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