

# PATENT SPECIFICATION

327,971

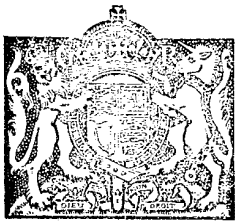
Application Date: Jan. 12, 1929. No. 1187/29.

Complete Left: Sept. 30, 1929.

Complete Accepted: April 14, 1930.

## PROVISIONAL SPECIFICATION.

### Improvements in and relating to Thermally-actuated Motive Devices.



We, CHARLES SCOTT-SNELL, and EDWARD SCOTT-SNELL, both British subjects, and INTERNATIONAL VACUUM POWER, LIMITED, a Company registered under the laws of Great Britain, all of 34, Victoria Street, London, S.W. 1, do hereby declare the nature of this invention to be as follows:—

This invention relates to thermally-actuated motive devices of the kind claimed in Specification No. 283,681.

In one example included in Specification No. 283,681 an oil fuel lamp feed pump device is described and illustrated.

We have found that although such devices operate satisfactorily in practice there is a limit to the pressure which can be derived from the system amounting to about 20 or 25 lb. per square inch.

In some cases it is desirable to employ higher delivery pressures and the object of the present invention is to provide means for the attainment of such pressures from thermally-actuated motive devices included in Specification No. 283,681.

The invention consists in a thermally-actuated motive device of the kind claimed in Specification No. 283,681 characterised by the provision of means ensuring sufficient delay in condensation of the vapour to permit substantial uniformity in temperature of the liquid in the generator after influx thereto of the comparatively cool liquid.

The invention also consists in a thermally-actuated device as set forth above wherein said means comprise a tubular space for the temporary retention of vapour after its ejection from the continuously heated conduit and prior to its condensation.

The invention also consists in a thermally-actuated device as set forth above wherein said tubular space is maintained sufficiently hot to preclude condensation therein by heat derived from the vapour as the latter ascends and enters said space.

The invention also consists in a thermally-actuated device as set forth above wherein said tubular space is connected to that part of the device where

condensation takes place by means of a conduit of restricted cross-sectional area in comparison with that of said space. 55

The invention also consists in thermally-actuated motive devices substantially as hereinafter described.

In carrying the invention into effect in one convenient form by way of example as applied to a thermally-actuated motive device for supplying oil under pressure to an incandescent mantle in a similar manner to that described with reference to Figures 3 and 4 of Specification No. 283,681, we interpose between the uptake pipe *o* and the vertical pipe *p* an intermediate tubular space which serves for the temporary retention of vapour after it has been ejected from the tube *m* and prior to its condensation by contact with the liquid in pipe *p*. This intermediate tubular space is provided within a tubular conduit which communicates at its upper end with the pipe *p* and into which the pipe *o* leads. The pipe *o* passes for some distance in contact with this tubular conduit or is actually embodied in it so that the latter is maintained at a temperature approximating to that obtaining within the upper end of the tube *o*. 60 65 70 75 80

Outlet from the tubular conduit is preferably somewhat restricted in order to delay discharge of vapour from the conduit. The lower end of the said conduit is connected to the tube *n* which is no longer connected directly to the tube *p*. A connection, however, is provided to this tube *p* from the conduit at a point approximately at the middle of the height thereof. 85 90

In operation heat is continuously supplied to the tube *m* and the vapour formed is ejected through the tube *o* as before but instead of passing directly to the tube *p* where condensation takes place it has to travel by way of the conduit described above, a slight delay occurring in the latter sufficient to ensure substantial uniformity in the temperature of the liquid in the tube *m* notwithstanding influx thereto of comparatively cool oil from the tube *n*. When condensation does occur none of the liquid in *m* is of such a high temperature as will enable it to boil, consequently the full effect of the pressure 95 100 105

[Price 1/-]

Price 4s 6d

Price 33p

Price 25p

drop resulting from condensation is utilised.

Dated this 12th day of January, 1929.  
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### COMPLETE SPECIFICATION.

#### Improvements in and relating to Thermally-actuated Motive Devices.

We, CHARLES SCOTT-SNELL, and EDWARD SCOTT-SNELL, both British subjects, and INTERNATIONAL VACUUM POWER, LIMITED, a Company registered under the laws of Great Britain, all of 34, Victoria Street, London, S. W. 1, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to thermally-actuated motive devices of the kind claimed in Specification No. 283,681.

In one example included in Specification No. 283,681 an oil fuel lamp feed pump device is described and illustrated.

We have found that although such devices operate satisfactorily in practice there is a limit to the pressure which can be derived from the system amounting to about 20 or 25 lb. per square inch.

In some cases it is desirable to employ higher delivery pressures and the object of the present invention is to provide means for the attainment of such pressures from thermally-actuated motive devices included in Specification No. 283,681.

The invention consists in a thermally-actuated motive device of the kind claimed in Specification No. 283,681 characterised by the provision of means effecting sufficient delay in condensation of the vapour to ensure thorough mixing of the comparatively cool liquid entering the generator due to development of hydrostatic head with the hot liquid in the generator, thus preventing or reducing to a minimum the possibility of boiling of the mixed liquid in the generator during condensation of the previously formed vapour.

The invention also consists in a thermally-actuated device as set forth above wherein said means comprise a tubular space for the temporary retention of vapour after its ejection from the continuously heated vapour generator and prior to its condensation.

The invention also consists in a thermally-actuated device as set forth above wherein said tubular space is maintained sufficiently hot to preclude condensation therein by heat derived from

the vapour as the latter ascends and enters said space.

The invention also consists in a thermally-actuated device as set forth above wherein said tubular space is connected to that part of the device where condensation takes place by means of a conduit of restricted cross-sectional area in comparison with that of said space.

The invention also consists in thermally-actuated motive devices substantially as hereinafter described with reference to the accompanying drawing.

The attached diagrammatic Figure illustrates one convenient manner of carrying the present invention into effect.

In carrying the invention into effect in one convenient form as illustrated by way of example applied to a thermally-actuated motive device for supplying oil under pressure to an incandescent mantle in a similar manner to that described with reference to Figures 3 and 4 of Specification No. 283,681, we interpose between the uptake pipe *o* and the vertical pipe *p* an intermediate tubular space 20 which serves for the temporary retention of vapour after it has been ejected from the tube *m* and prior to its condensation by contact with the liquid in pipe *p*. This intermediate tubular space is connected at a point slightly below its upper end with the pipe *p* by means of a pipe 22. The pipe *o* passes for some distance in contact with the tubular space 20 or is actually embodied in it so that the latter is maintained at a temperature approximating to that obtaining within the upper end of the tube *o*.

Inlet to the pipe 22 from the tubular conduit 20 is preferably somewhat restricted in order to delay discharge of vapour from the conduit 20. The lower end of the said conduit is connected to the tube *n* which is no longer connected directly to the tube *p*. A connection 21, however, is provided to this tube *p* from the conduit at a point approximately at the middle of the height thereof.

The circulator tube 22 as mentioned above projects slightly below the upper end of the pipe *o* thus preventing vapour in the latter taking a short cut to the pipe

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*p* without first occupying the conduit 20.

In operation heat is continuously supplied to the tube *m* through the conducting lug 15 and the vapour formed after a time interval is caused to pass upwards through the tube *o* on account of the hydrostatic head developed due to different levels of liquid in the tubes *n* and *o*. This is accompanied by a flow of cool liquid from the tube *n* to the tube *m*. The vapour in the tube *o* instead of passing directly to the tube *p* where condensation takes place has to travel first into the conduit 20. Due to the momentum of the liquid column in *n* the vapour is caused fully to occupy the conduit 20 and a delay thus occurs in the latter before the vapour can reverse its direction of motion to be transferred through the tube 22 under the influence of the now unbalanced column of liquid in the tubes *p*, 21, 20. This delay is sufficient to ensure thorough mixing of the incoming liquid from the tube *n* with the remaining hot liquid in the generator *m*. The temperature of the mixture is thus reduced to such a degree that when condensation does occur in the tube *p* none of the liquid in *m* is of sufficiently high temperature as will enable the reduced pressure due to condensation to cause it to boil, consequently the full effect of the pressure drop resulting from condensation is utilised.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A thermally-actuated motive device of the kind claimed in Specification No. 283,681 characterised by the provision of means effecting sufficient delay in condensation of the vapour to ensure thorough mixing of the comparatively cool liquid entering the generator due to development of hydrostatic head with the hot liquid in the generator thus preventing or reducing to a minimum the possibility of boiling of the mixed liquid in the generator during condensation of the previously formed vapour.

2. A thermally-actuated motive device as claimed in Claim 1 wherein said means comprise a tubular space for the temporary retention of vapour after its ejection from the continuously heated vapour generator and prior to its condensation.

3. A thermally-actuated motive device as claimed in Claim 2 wherein said tubular space is maintained sufficiently hot to preclude condensation therein by heat derived from the vapour as the latter ascends and enters said space.

4. A thermally-actuated motive device as claimed in Claim 2 or Claim 3 wherein said tubular space is connected to that part of the device where condensation takes place by means of a conduit of restricted cross-sectional area in comparison with that of said space.

5. Thermally-actuated motive devices substantially as hereinbefore described with reference to the accompanying drawing.

Dated this 30th day of September, 1929.  
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*[This Drawing is a full-size reproduction of the Original]*

