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(11) **EP 1 217 296 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
26.06.2002 Bulletin 2002/26

(51) Int Cl.7: **F23D 5/12**

(21) Application number: **00311502.9**

(22) Date of filing: **20.12.2000**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE TR**
Designated Extension States:
AL LT LV MK RO SI

(72) Inventors:
• **Harvey, Geoffrey Philip**
Abington, Cambridge CB1 6BQ (GB)
• **Farnell, Michael Robin Stane**
Westbury-on-Trym, Bristol BS9 2DB (GB)

(71) Applicants:
• **HARVEY, Geoffrey Philip**
Cambridge CB1 6BQ (GB)
• **Keith W Nash & Co.**
Cambridge CB2 1DP (GB)

(74) Representative: **Morton, Colin David et al**
Keith W Nash & Co.
Pearl Assurance House
90-92 Regent Street
Cambridge CB2 1DP (GB)

(54) **Vaporising oil burners**

(57) A vaporising oil burner has a vaporising chamber (3) to which oil is supplied by an oil inlet pipe (8). To prevent the accumulation of carbon deposits in the oil inlet pipe (8), the latter is kept cooler than hitherto by surrounding the downstream end of the oil inlet pipe (8) with a tube (9) which is itself surrounded by a sleeve (6)

threaded into a bore in the wall of the vaporising chamber (3). Any deposits which do form on the oil inlet pipe (8) can be pushed into the base of the vaporising chamber (3) by a cleaning rod (12).

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Description

[0001] This invention relates to a vaporising oil burner and to an assembly for attaching the downstream end of an oil inlet pipe to a vaporising chamber of such a burner.

[0002] Cookers and similar heating appliances are commonly fired by vaporising oil burners, particularly where natural gas is not available. Such burners suffer from an accumulation of carbon-like deposits in the oil inlet pipes supplying the oil to the vaporising chambers of the burners. These deposits also tend to form over the outlet of the oil inlet pipe where it debouches into the vaporising chamber of the burner. Accumulation of deposits within the oil inlet pipe is particularly pronounced where the temperature of the pipe is highest, typically at its downstream end where it is close to the vaporising chamber. The invention aims to solve this problem.

[0003] According to one aspect of the invention there is provided an assembly for attaching the downstream end of an oil inlet pipe to a vaporising chamber of a vaporising oil burner, the assembly permitting attachment of the oil inlet pipe to the chamber in a manner providing thermal insulation between the vaporising chamber and the oil inlet pipe, in order to reduce or eliminate the formation of carbon deposits in the pipe during use. The thermal insulation keeps the inlet pipe cool, thereby preventing (or reducing) the accumulation of carbon deposits in the bore of the inlet pipe.

[0004] Preferably the assembly includes a portion of the length of the oil inlet pipe at the downstream end thereof.

[0005] The assembly may include a mounting sleeve formed for reception in an aperture in a wall of the vaporising chamber, the mounting sleeve surrounding said portion of the inlet pipe with clearance which contributes to said thermal insulation. The mounting sleeve may be formed with external threads for threading into the aperture, the sleeve surrounding the portion of the inlet pipe with all-round radial clearance.

[0006] In the preferred embodiment, a tube surrounds the portion of the pipe with radial clearance and is in turn surrounded by the sleeve, the downstream end of the sleeve being attached to the downstream end of the tube and the pipe portion being supported by the upstream end of the tube which projects outwardly of the sleeve in an upstream direction so that there is a serpentine or convoluted conductive heat flow path between the sleeve and the portion of the length of the oil inlet pipe.

[0007] To enable the removal of any deposits which do form in or at the end of the inlet pipe, the assembly may include a cleaning rod inserted into the oil inlet pipe. The rod can be moved in the inlet pipe with a reciprocating and rotating motion, to dislodge any carbon deposits. This can be done on a regular basis or when the performance of the burner begins to deteriorate.

[0008] The invention will now be further described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a fragmentary view, partly in section, showing a vaporising oil burner fitted with an assembly according to the invention,

Figure 2 is a fragmentary sectional view through the assembly of Figure 1,

Figure 3 illustrates an optional cleaning rod of the assembly,

Figure 4 illustrates an optional duct of the assembly, and

Figure 5 is a sectional view corresponding to that of Figure 2 but showing a modified construction also in accordance with the invention.

[0009] The vaporising oil burner typically forms part of an Aga (registered trade mark) cooker or other oil burning appliance. The burner has a base casting 2 defining a vaporising chamber 3 closed by a cap 4. The casting 2 is installed above a burner firebox floor 1. The wicks used for lighting the burner are illustrated at 5. One side wall of the casting 2 has a tapped hole receiving a sleeve in the form of a threaded hexagon nipple 6 the inner end of which projects into the chamber 3. At this inner end the nipple 6 supports, by means of an annular body of fire-clay forming a seal 7, the downstream end of an oil inlet pipe 8. Between the oil inlet pipe 8 and the nipple 6 is a circular-section stainless steel tube 9. The seal 7 thus closes off the downstream end of the annular space between the oil inlet pipe 8 and the tube 9. Unwanted penetration of the fire-clay into this annular space can be prevented by means of a washer. At its downstream end, the tube 9 is attached to the inner end of the nipple 6 and at its upstream end the tube 9 supports the inlet pipe by means of a sleeve or ferrule 10 soldered or brazed in position. As best shown in Figure 2, the nipple 6 surrounds the tube 9 with all-round radial clearance (apart from at the extreme downstream end of the nipple 6) and the tube 9 surrounds the pipe 8 with all-round radial clearance, apart from at the upstream and downstream ends of the tube 9.

[0010] Referring to Figure 3, a spring steel cleaning rod 12 may form part of the assembly. The rod 12 has an outer end carrying a formation 13 for ease of grasping and its inner end 14 can be moved through the bore of the inlet pipe to clean the latter of any carbon deposits which might build up in the bore of, or at the downstream end of, the inlet pipe. The rod 12 passes through a fuel elbow 15 which directs oil from a supply pipe 16 to the inlet pipe 8. A packed gland can be tightened by a nut 17 to prevent oil leakage at the point where the rod 12 enters the fuel elbow 15. At a point near its end 14, the

rod 12 may incorporate a slight bend to increase the frictional engagement of the inner end of the rod with the bore of the inlet pipe 8 so as to improve the scraping or cleaning effect of the rod which has sufficient length for the inner end 14 to project into the vaporising chamber. Thus, the rod not only clears the bore of the inlet pipe 8 but also dislodges any carbon deposits which might tend to form on the downstream end of the inlet pipe 8. The pipe 8 debouches into the chamber 3 at a position above the base thereof, so that any carbon deposits which are dislodged by the rod 12 fall into the base of the vaporising chamber.

[0011] In its length between the elbow and the chamber, the inlet pipe 8 preferably passes through a rectangular section air duct 18 which has open ends and guides combustion air towards the burner of the cooker. This flow of air through the duct helps to cool the inlet pipe 8. The duct 18 is shown in broken lines in Figure 1 to illustrate its position, when fitted.

[0012] In the modification of Figure 5, the inlet pipe is of composite construction, having a main portion 8a and a smaller downstream portion 8b made of sterling silver. The portions 8a and 8b are joined by a soldered bush 19. The purpose of the sterling silver, which has a very high thermal conductivity, is to reduce the possibility of localised overheating at the extreme downstream end of the inlet pipe where it is exposed to the highest temperatures.

[0013] Typical dimensions are: for the pipe 8, 6mm outside diameter and 4.8mm internal diameter; for the rod 12, 3.00mm diameter.

[0014] The fireclay seal 7 which is both moderately fragile and also slightly permeable to fuel may be replaced with a high-temperature-resisting plastic washer either force fit or glued into the annular gap between the inner end of nipple 6 and the downstream end of oil inlet pipe 8. As a further alternative, the seal 7 can be replaced by a very thin stainless steel washer with its outer circumference attached to the inner end of nipple 6 and/or the downstream end of tube 9 by soldering, brazing or welding and its inner aperture similarly attached to the downstream end of oil inlet pipe 8. This latter method provides for an hermetic sealing of the annular space between oil inlet pipe 8 and outer tube 9 against unwanted ingress of fuel and/or fuel vapour and further allows this annular space to be either partially or totally evacuated of air or gas before sealing thus affording the additional advantage of reducing conductive heat flow in the annular gap.

[0015] An existing cooker can be modified by the fitting of an assembly according to the invention, or the assembly can be fitted as original equipment. In either case, the tendency for carbon to be deposited in or at the end of the pipe 8 is minimised because the pipe is kept at a lower temperature than hitherto, mainly as a consequence of the serpentine conductive heat flow path between the nipple 6 and the downstream portion of the oil inlet pipe surrounded by the tube 9, but also

by the cooling effect of the air passing through the duct 18. Any carbon which does form in or at the end of the inlet pipe 8 can be dislodged by use of the rod 12, the carbon so dislodged falling into the base of the chamber 3 which can at intervals be cleaned.

Claims

1. An assembly for attaching the downstream end of an oil inlet pipe to a vaporising chamber of a vaporising oil burner, the assembly permitting attachment of the oil inlet pipe to the chamber in a manner providing thermal insulation between the vaporising chamber and the oil inlet pipe, in order to reduce or eliminate the formation of carbon deposits in the pipe during use.
2. An assembly according to claim 1, wherein the assembly includes a portion of the length of the oil inlet pipe at the downstream end thereof.
3. An assembly according to claim 2, wherein the assembly includes a mounting sleeve formed for reception in an aperture in a wall of the vaporising chamber, the mounting sleeve surrounding said portion of the inlet pipe with clearance which contributes to said thermal insulation.
4. An assembly according to claim 3, wherein the mounting sleeve is formed with external threads for threading into the aperture, the sleeve surrounding the portion of the inlet pipe with all-round radial clearance.
5. An assembly according to claim 3 or 4, wherein a tube surrounds the portion of the pipe with radial clearance and is in turn surrounded by the sleeve, the downstream end of the sleeve being attached to the downstream end of the tube and the pipe portion being supported by the upstream end of the tube which projects outwardly of the sleeve in an upstream direction so that there is a serpentine or convoluted conductive heat flow path between the sleeve and the portion of the length of the oil inlet pipe.
6. An assembly according to claim 5, wherein the downstream end of the annular space between the pipe and tube is sealed by a body of an insulating material, such as fireclay.
7. An assembly according to claim 5 or 6, wherein the tube is made of a material, such as stainless steel, having a poor thermal conductivity in comparison with the thermal conductivity of the oil inlet pipe.
8. An assembly according to claim 7, wherein the pipe

is supported in the upstream end of the tube by a sleeve or ferrule.

9. An assembly according to any of the preceding claims and including a rod inserted into the oil inlet pipe to dislodge carbon deposits in or at the end of the pipe and to push such deposits into the vaporising chamber. 5
10. An assembly according to claim 9, wherein the rod is bent at an intermediate point along its length to increase the frictional engagement of the rod within the bore of the inlet pipe, and, by rotation of the rod, to allow a greater portion of the bore to be scraped by the rod. 10 15
11. An assembly according to any of the preceding claims, wherein the downstream length of the oil inlet pipe is made of a material of a higher thermal conductivity than the remainder of the length of the oil inlet pipe. 20
12. An assembly according to any of the preceding claims and including a duct which surrounds the inlet pipe and is operative to guide incoming combustion air past the inlet pipe to cool the latter. 25
13. An assembly according to any of the preceding claims and fitted to a vaporising oil burner in a cooker or other oil burning appliance. 30
14. A vaporising oil burner comprising a vaporising chamber and an inlet pipe for supplying oil to the chamber, a downstream end of the pipe being attached to the burner with the provision of thermal insulation between the chamber and the oil inlet pipe, in order to reduce the accumulation of carbon deposits in the pipe during use. 35
15. A vaporising oil burner according to claim 14, wherein the downstream end of the pipe debouches into the chamber at a position above the base of the chamber, so that carbon deposits can accumulate in the chamber to a substantial depth before impeding the flow of oil through the inlet pipe. 40 45

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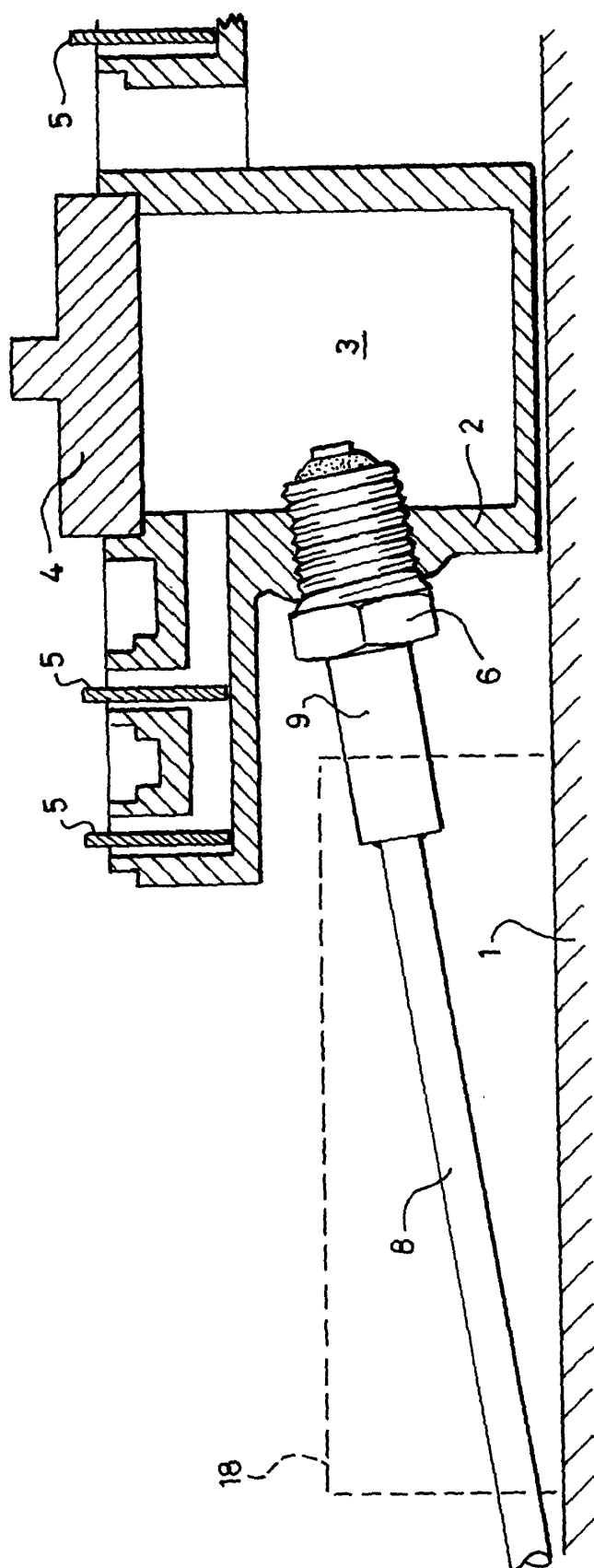


Fig. 1

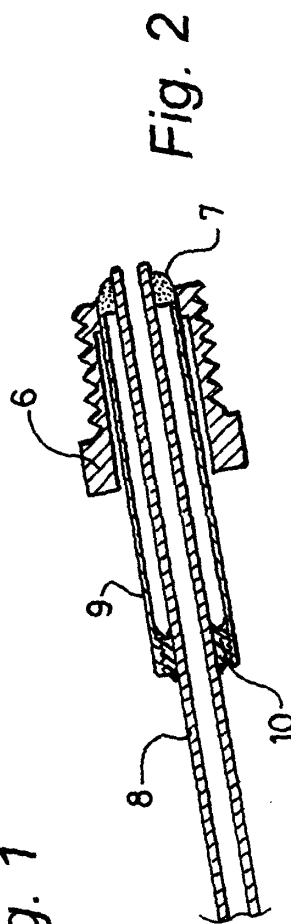


Fig. 2

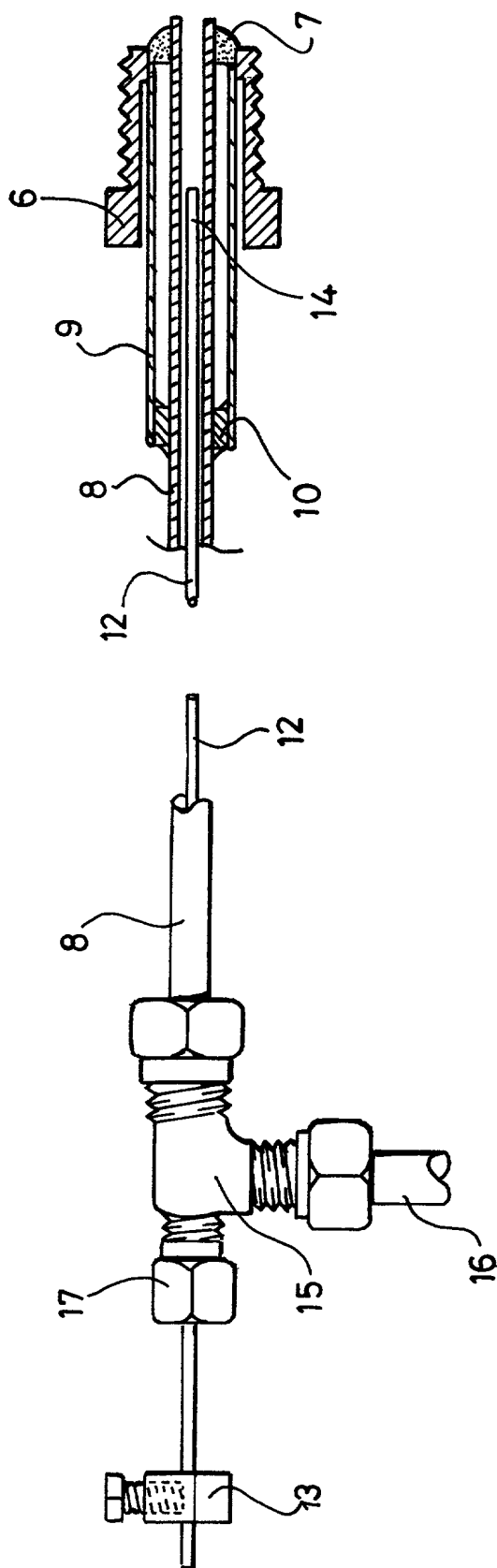
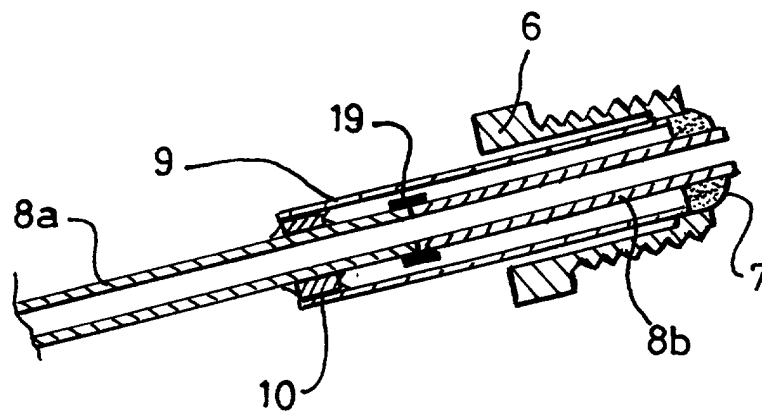
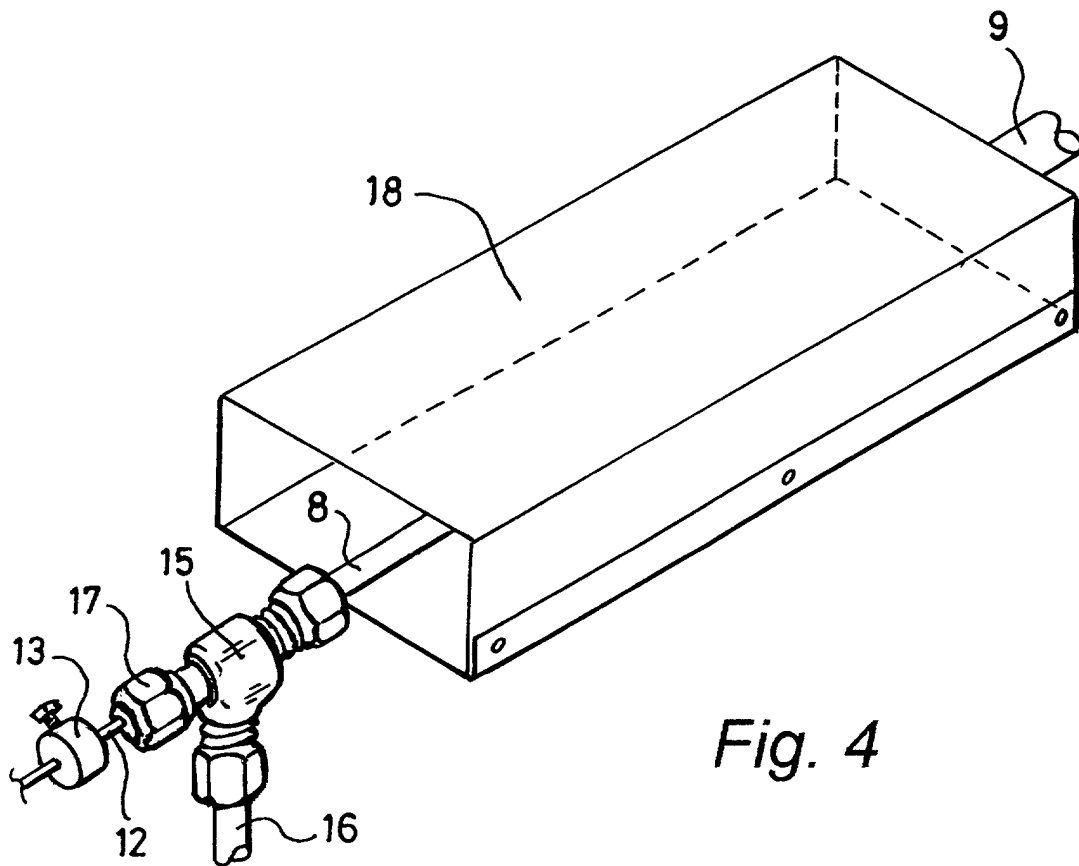


Fig. 3





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EUROPEAN SEARCH REPORT

Application Number
EP 00 31 1502

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			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			F23D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 21 May 2001	Examiner Coli, E
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03 82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 00 31 1502

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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