第 39 回機械　問題・原文ファイル

★★★ ＜第 39 回知的財産翻訳検定試験【第 19 回英文和訳】＞ ★★★

≪機械工学分野≫

【解答にあたっての注意】

１．問題の指示により、「翻訳課題」と「チェック課題」があります。翻訳課題では翻訳し、チェック課題では既存の訳文をチェックしてください。解答は別紙「解答ファイル」に記載してください。

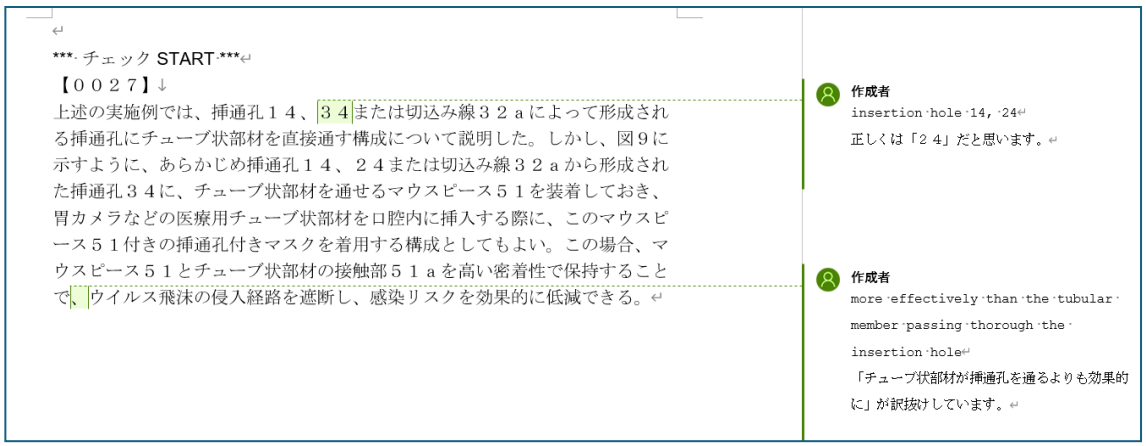
２．翻訳が求められる箇所は、*** 翻訳 START ***から*** 翻訳 END ***までの範囲です。

３．チェックが求められる箇所は、*** チェック START ***から*** チェック END ***までの範囲です。チェック対象の訳文は「解答ファイル」に記載されています。

４．チェック課題の解答方式

- 訳文の編集はせずに、訳文の不適切な箇所を指摘したうえで、正しい訳とその根拠を記載した「チェックコメント」を作成してください。

- チェックコメントの記載方式
  ①「解答ファイル」の該当箇所に Word コメント機能「吹き出し」で書く
  例：



  ②「解答ファイル」ではなく別途「チェックコメント」ファイルを作成しそちらに書く

  例：

受験番号：
氏名：
科目：機械工学

チェックコメント

問２
段落【００２７】
和訳の１行目「挿通孔１４、３４」
原文は「insertion hole 14, 24」ですので、「挿通孔１４、２４」の誤りだと思います。

問２
段落【００２７】
和訳の８行目
原文の「more effectively than the tubular member passing thorough the insertion hole」が訳抜けしています。「ウイルス飛沫の侵入経路を遮断し」の直前に「チューブ状部材が挿通孔を通るよりも効果的に」と入れるべきだと思います。

①②のどちらでも結構です。②の場合はファイル名を「チェックコメント（受験番号）」とし、対象箇所が分かるよう行や段落を明記してください。

５．全体の解答字数に特に制限はありません。適切な箇所で改行してください。

６．課題文に段落番号がある場合、これを訳文に記載してください。

７．設問は複数あります。それぞれの設問の指示に従い、すべて解答してください。

問１．以下の背景技術の記載を和訳してください。

***** 翻訳 START *****

(2) It has long been customary to shot peen to increase fatigue strength, to relieve tensile stresses that contribute to stress-corrosion cracking, to form and straighten metal parts, etc. A detailed description of this process and the materials used therein is found in the ASM Committee "Metals Handbook," Volume 2, 8th Division, 1964, pages 398-405, and incorporated herein by reference. Prior art shot peening processes are also described in numerous patents, e.g., U.S. Pat. Nos. 2,542,955 and 2,982,007. In conventional shot peening, spheroidal particles of cast steel, cast iron, glass, etc. are blown or mechanically impelled in a high velocity stream against the surface to be treated. The individual shot particles produce shallow, rounded overlapping dimples in the surface, stretching it radially from each point of impact and causing cold working and plastic flow. The resultant compressive stress tends to counteract tensile stresses imparted to the substrate by the preceding rolling, bending, abrading, and similar processes.

(3) The degree of peening, which is generally expressed as "peening intensity," is a function of the weight, size, hardness and velocity of the peening particles, exposure time, type of substrate, angle of impingement, and various other factors. It is conventional to express peening intensity in terms of Almen arc height, according to SAE Test J442, described in some detail in Military Specification MIL-S-13165B. In this test, a thin flat piece of steel is clamped to a solid block and exposed to a blast of shot, which, as previously indicated, tends to stretch the surface, so that the strip will be curved when removed from the block. Test strips are SAE 1070 cold rolled spring steel uniformly hardened and tempered to a hardness of 44-50 Rockwell C, 3±0.015 inch long and 0.745-0.750 inch wide. The strips are one of three thicknesses: A, 0.051±0.001 inch; C, 0.0938±0.001 inch; and N, 0.031±0.001 inch. The height of arc of the resultant chord in inches is referred to as the Almen arc height, greater heights indicating greater peening intensity for a given test strip thickness.

(4) Effective though it is for many purposes, conventional shot peening suffers from disadvantages which drastically limit its usefulness. For example, large and expensive equipment is required for rapidly impelling shot toward a surface and collecting, screening and recirculating the shot particles. Equipment of this type is not readily portable, and hence is suitable only for those metal pieces or parts which can be brought

to the shot peen station. It is virtually impossible to shot peen a part while it still remains attached to another piece of equipment.

(5) Despite the foregoing drawbacks to the shot peening process, there has previously been no effective alternative. It is to this unsolved need that the present invention is directed.

***** 翻訳 END *****

問２．図を参考に、以下の実施形態の訳文チェックをしてください。

(1) Referring to FIG. 1, I have illustrated a typical asphalt paving machine 1. In a paving operation, the machine proceeds in a direction of the arrows 2. Asphalt is dumped to the hopper 3 from which it is fed rearwardly and outwardly to present a mass extending transversely across the machine between side plates (one of which is noted at 4) in front of the screed 5 which is spaced above the surface 6. As the machine moves forward, asphalt goes under the screed where it is compacted on the surface 6.

(2) In a paving operation the machine will travel in one direction laying down a section of asphalt which is subsequently rolled by equipment not shown to further compact the material.

(3) Then the machine is reversed in direction and lays down an adjacent section which is also rolled. The two sections are interfaced by a longitudinal joint.

***** チェック START *****

(4) The apparatus of the present invention is disposed on the side of the machine between the screed and the side plate. As the machine is moved forward, asphalt goes under the apparatus where it is compacted to form a wedge shaped layer so that the longitudinal joint is tapered rather than vertical. A typical joint is diagramatically illustrated in FIG. 2.

(5) A pair of adjacent paved sections 10 and 11 are connected by the joint area 12. The sections 10 and 11 have planar top or work surfaces 13 and 14. The longitudinal edges of the section 10 are indicated at 15 and 16. The longitudinal edges of the section 11 are indicated at 17 and 18.

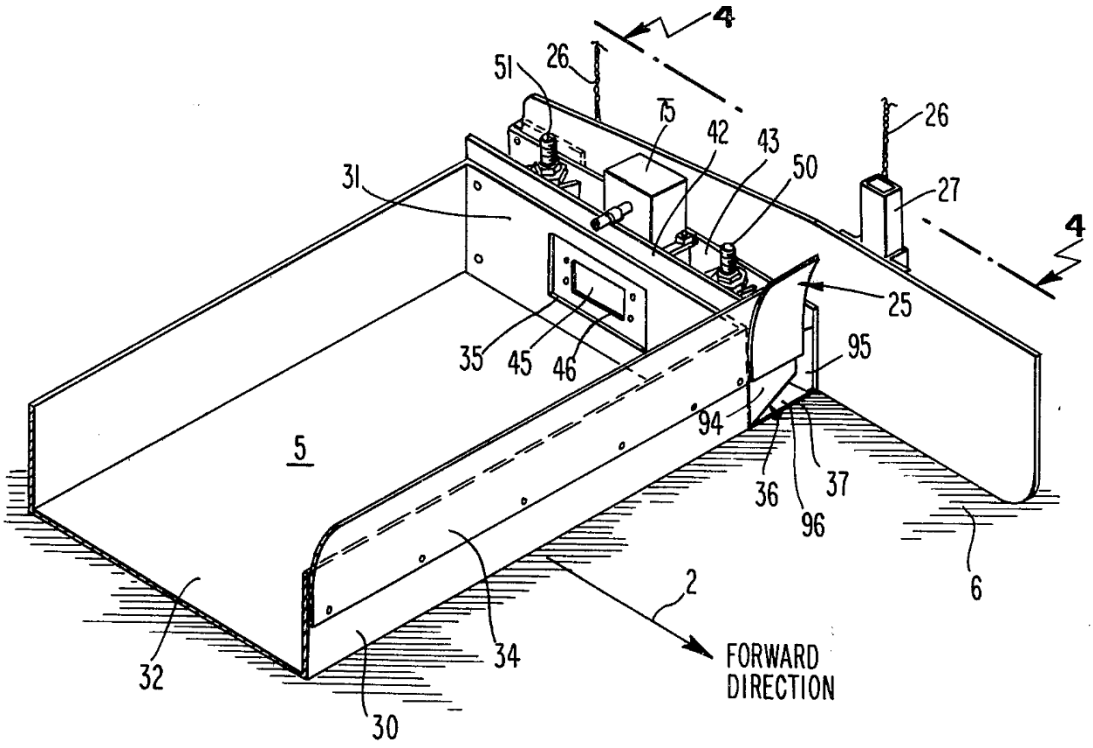
(6) The joint area 12 includes wedge or triangular shaped, overlying layers 20 and 21. The layer 20 extends out from the edge 15 and is tapered downwardly to form the end surface 22. The layer surface 21 extends out from the edge 18 and overlies the layer 20 and is tapered upwardly from the surface 6 to form the end surface 23 which tightly engages the surface 22. The engagement of the surfaces 22 and 23 forms a tapered longitudinal joint 24, that is to say, a joint which is not vertical or is oriented with respect to the surfaces 13 and 14 an angle less than 90 degree. An acute angle of 20 degree is preferred.

(7) Dimensions for a typical joint as illustrated in FIG. 2, for a top or finish course, may be as follows. Each of the sections 10 and 11 may be approximately 10 feet in width and 11/2 inches in height with the layers 20 and 21 extending outwardly from the respective edges a distance of about 61/2 inches. This forms an acute angle for the joint 24 of about 20 degree.

(8) The apparatus and its use in making the above joint 24 will now be described.

(9) Referring to FIG. 3, the apparatus 25 of the invention is between the machine side plate 4 and the screed 5. For simplification purposes, only a portion of the full transverse width of the screed 5 is illustrated. The apparatus is supported on one end of the screed 5 and engages the side plate 4 in a snug, sliding fit. The screed and side plate, except as slightly modified to accommodate the joint apparatus 25, are conventional. The side plate 4 is supported from the machine 1 by the chains 26 and the adjusting bracket 27. The plate can be adjusted both in a vertical and transverse direction. Normally the side plate is vertically adjusted so that it rests on the surface 6 and can move vertically relative to the apparatus 25 in response to irregularities or contours in the surface 6.

*** チェック **END** ***



問３．以下の実施形態および図９に基づき、その下に続く請求項１および２を和訳してください。和訳に際しては、クレームされている各要素のうち、図９に示される要素に対応するものがあれば、その参照符号を訳文中に括弧書きにて示してください（但し、該当する要素が図９にない場合には「（なし）」と表示してください）。

As can be seen in Fig. 9, the hybrid furnace comprises a microwave cavity 50, a microwave generator 52 and a waveguide 54 for transporting microwaves from the microwave generator 52 to the microwave cavity 50. In a preferred embodiment, the microwave generator 52 may comprise a 2.45GHz, 1kW magnetron connected to a power supply unit 56, while the waveguide 54 may include a circulator 58, a dummy load 60 and a tuner 62.

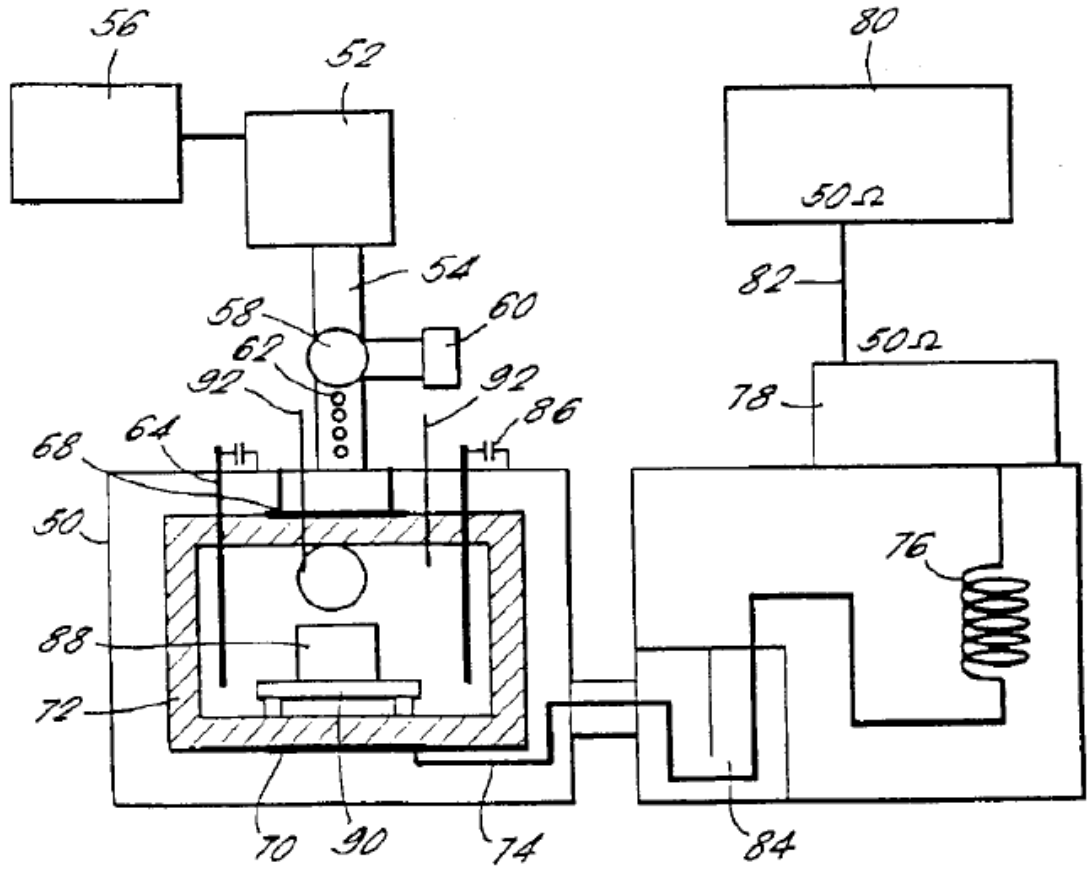
A plurality of non-retractable, radiant resistance heating elements 64 project through a wall of the microwave cavity 50 and into the sample volume. By ensuring that the heating elements 64 are highly conductive, their skin depth is kept to a minimum and with it the amount of microwave power that they absorb. Using this arrangement the furnace has been shown to be capable of achieving temperatures in excess of 1,750°C using 3kW of radiant heating and 2kW of microwave power without damaging either the heating elements 64 or the lining of the furnace. In particular, no arcing has been observed either between the heating elements 64 or between the heating elements and the walls of the microwave cavity 50.

In order to prevent microwaves leaking from the microwave cavity 50, each of the heating elements 64 passes into the sample volume through a respective capacitive lead-through. An example of one such lead-through is described in the applicant's earlier International Patent Application No. PCT/GBYY/XXXXX, the contents of which are incorporated herein by reference.

The RF electric field is introduced into the system between the electrodes of a parallel plate capacitor or applicator formed by two metal plates 68 and 70 on the outside of the insulation 72. Alternatively, the two plates 68 and 70 can be embedded within the insulation 72 or even inside the hot zone provided that the metal used can withstand the temperatures to which it will be exposed. The two metal plates 68 and 70 are connected through a transmission line 74 and a variable inductance 76 to an automatic impedance matching network 78. This impedance matching network 78 constantly tunes the impedance of the system to 50Ω. A 13.56MHz, lkW radio-frequency solid-state generator

80 with a 50Ω output impedance is connected to the automatic impedance matching network 78 by a standard 50Ω coaxial cable 82.

FIG. 9.



***** 翻訳 START *****

1. A hybrid furnace comprising a microwave source, an enclosure for the confinement of both microwave and RF energy and for containing an object to be heated, means for coupling the microwave source to said enclosure, an RF source adapted to dielectrically heat the object to be heated, and means for coupling the RF source to said enclosure, characterised in that the object to be heated is selected from the group consisting of ceramics, ceramic-metal composites, metal powder components, and engineering ceramics, the furnace further comprises control means for simultaneously applying both microwave energy and RF energy and for controlling the quantity of microwave energy and RF energy to which the object to be heated is exposed.

2. A method of operating a hybrid furnace comprising a microwave source, an enclosure for the confinement of both microwave and RF energy and for containing an

object to be heated, means for coupling the microwave source to said enclosure, an RF source adapted to dielectrically heat the object to be heated, and means for coupling the RF source to said enclosure, the object to be heated being selected from the group consisting of ceramics, ceramic-metal composites, metal powder components, and engineering ceramics, the method comprising the steps of actuating the microwave source to heat the object to be heated and actuating the RF source to provide an oscillating electric field within the object to be heated to dielectrically heat the object to be heated such that both microwave energy and RF energy are applied simultaneously.

***** 翻訳 END *****