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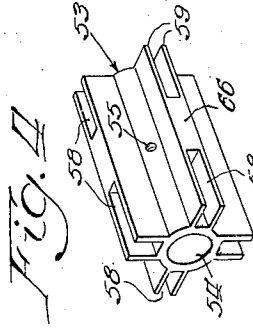
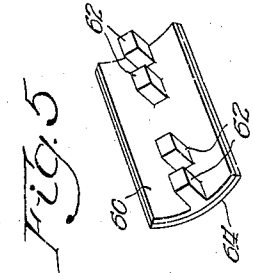
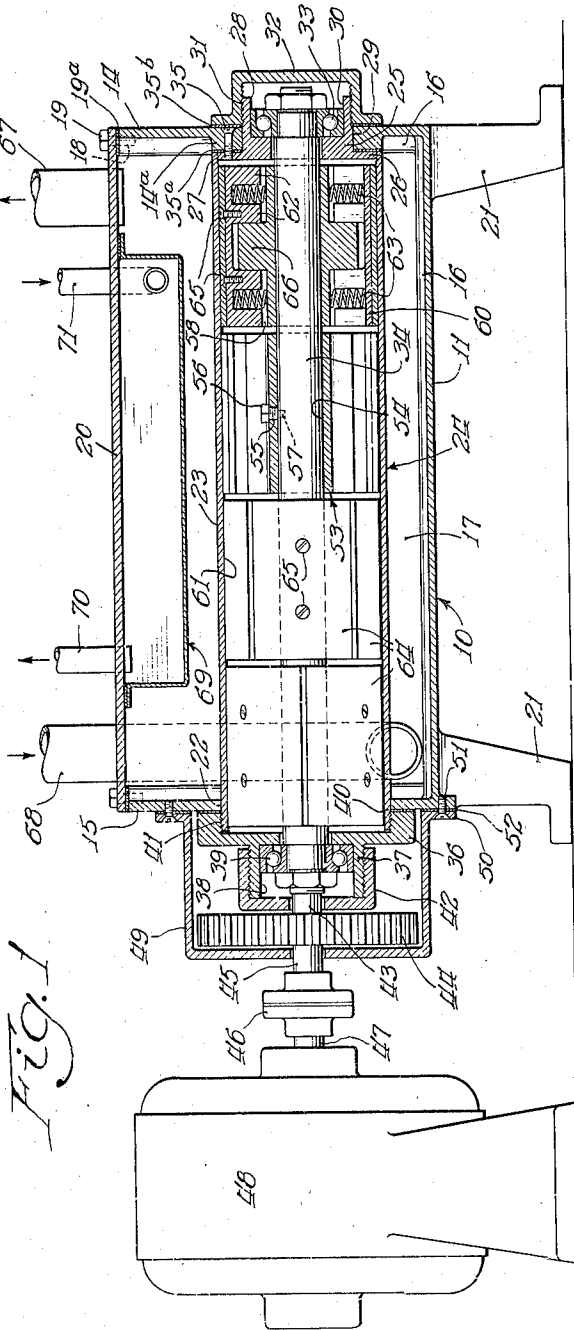
E. A. TESCH

2,251,344

MACHINE FOR GENERATING HEAT BY FRICTION

Filed Oct. 17, 1938

2 Sheets-Sheet 1



Inventor:
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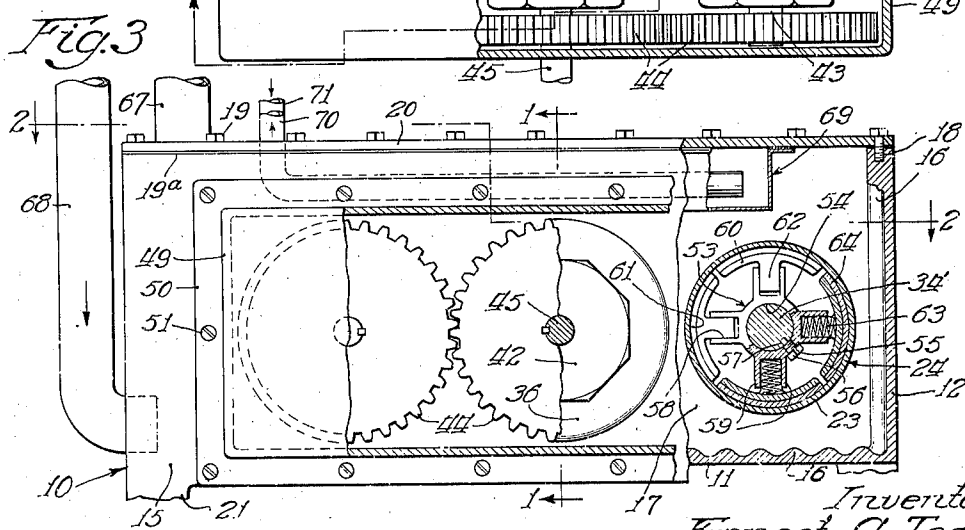
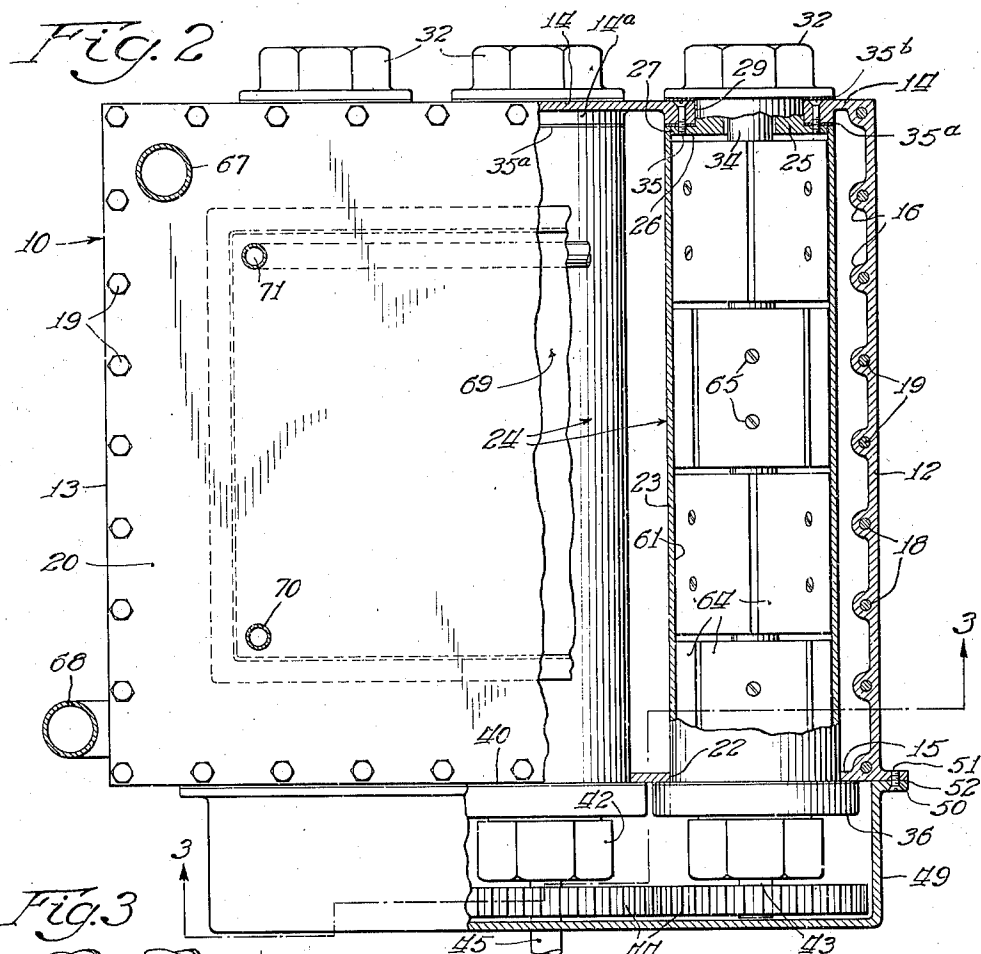
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MACHINE FOR GENERATING HEAT BY FRICTION

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UNITED STATES PATENT OFFICE

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MACHINE FOR GENERATING HEAT BY FRICTION

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Application October 17, 1938, Serial No. 235,537

3 Claims. (Cl. 122-26)

This invention relates to improvements in machines for generating heat by friction and which have particular utility for heating water or other fluid such as steam, for space heating purposes.

An advantage of such a friction heater is that it may be safely used to heat garages or other places where the fire hazard must be minimized, as well as stores, apartments, homes, etc., without the inconvenience of smoke or soot.

Among other objects, the present invention aims to provide an improved device of this character which is relatively simply in construction and operation, and which may be economically employed over extended periods of time.

The invention comprises certain details of construction and arrangement of parts hereinafter more fully described in the following specification, which will be readily understood by reference to the accompanying drawings, in which—

Figure 1 is a longitudinal sectional view of a preferred form of the invention, being a section taken on the line 1-1 of Fig. 3, and associated with a source of power, in this instance an electric motor;

Figure 2 is a top view of the structure of Fig. 1 rotated ninety degrees and with parts broken away and in section for clearness of description;

Figure 3 is a cross-section taken on various planes, as indicated by the line 3-3 of Fig. 2;

Figure 4 is a perspective view of one of the parts; and

Figure 5 is another perspective view of another part.

In the illustrative construction the container 10, comparable to what is generally referred to as a boiler, is of box-like form having a bottom wall 11, side walls 12 and 13, rear wall 14 and front wall 15. This much of the container is desirably formed integrally and the inner faces of these walls advantageously are corrugated as at 16. The upper ends of the side wall corrugations, as indicated at 18, serve to receive screw holes into which the screw bolts 19 screw to clamp the closure or cover 20 for the container, a water-tight gasket 19a being clamped therebetween. Feet 21 may space the container from the floor.

The front wall 15 of the container has one or more, in this instance three, perforations 22 therein, each of which is large enough to snugly receive the jacket 23 of the heat exchange unit indicated as a whole by the numeral 24, of which there are shown in this instance three. The jacket 23 is closed at its rear end by a tail piece

25 which has a flange 26 screw-threadedly received as at 27 in the rear open end of the jacket 23 to close the same, and this tail piece 25 also has a reduced part 28 which passes through an opening 29 in the rear wall 14 of the container, this opening being of smaller size than the opening 22 in the front wall and snugly receiving the part 28 therethrough. The tail piece part 28 is also axially recessed as at 30 and exteriorly threaded as at 31 to have screwed thereon a cap nut 32, but leaving space within for an anti-friction bearing 33 for a rotatable shaft 34 which is mounted centrally of the jacket 23. The jacket and end piece 25 are prevented from rotating by screw bolts 35 which pass through the rear wall 14 of the container and into the flange 26 of the tail piece. Where the bolts 35 are received in the end wall the walls are desirably somewhat thickened inwardly as at 14a to provide a boss against which the heat exchange unit is clamped. The bolts 35 also draw the unit against a packing 35a which abuts the thread joint 27. The outer ends of the screw bolts 35 as shown are countersunk in the wall 14 so as to be flush therewith and so that the cap 32 may clamp a packing 35b therebetween.

At its forward end the heat exchange unit 24 has screwed upon its periphery exteriorly of the front container wall 15 a head 36 which has a reduced part 37 also axially recessed as at 38 to receive the anti-friction bearing 39 for this end of the rotatable shaft 34. The head 36 clamps between it and the wall of the container a packing 40 which seals the thread joint 41 between the head and jacket. Thus, the heat exchange units are mounted to pass through the container without impairing the water-tightness of the latter. A cap nut 42 screw-threaded on the exterior of the part 37 closes the anti-friction recess for the forward end of the shaft, but unlike the rear end, the cap 42 is centrally perforated to receive therethrough the forward continuation 43 of the shaft 34 and upon which continuation is keyed a gear 44. Each of the heat exchange units has such a gear and these gears intermesh so that rotation of one shaft will rotate the other at the same speed.

The shaft of the middle unit is still further extended as at 45 to engage a flexible coupling 46 which connects this shaft with the driving shaft 47 of an electric motor 48. Thus operation of the motor will rotate all the shafts 34 simultaneously and at the same speed.

The gears 44 desirably rotate in an oil chamber formed by the casing 49 which is flanged as

at 50 and clamped by the screws 51 to the outer face of the wall 15, an oil packing 52 being interposed therebetween.

For friction producing purposes, each of the shafts 34 has secured thereon friction shoe holders exemplified in this instance by the part 53 shown separately in Fig. 4. I prefer to have a series of these shoe holders 53 arranged longitudinally on each of the shafts 34. The holder has an annular center 54 which fits snugly on the shaft 34 and which is perforated as at 55 to receive a set-screw 56 which keys the holder to the shaft through a perforation 57 in the latter. Extending from the central part 54 are a plurality of radially and longitudinally extending channels 58 which are desirably formed by pairs of relatively thin parallel walls 59, the pairs being angularly spaced apart ninety degrees on the periphery of the central part 54.

Each of the shoe holders 53 carries four segmental shoes 60, the bodies of these shoes being arcuate to suit the bore 61 of the heat exchange jacket 23, and having a plurality of pairs of longitudinally arranged tongues 62, these tongues being somewhat slidably received in the channels 58 of the holder 53. Between each pair of tongues 62 is inserted a compression coil spring 63 which presses the shoe outwardly of the holder and toward the wall of the bore 61, the shoe however, desirably contacting the bore through the intermediation of a separable facing 64 which is secured to the shoe proper as by screws 65. This facing is desirably of a specially hardened metal so as to resist wear but is replaceable when substantial wear has occurred, without necessitating the replacement of the shoe itself. Between the pairs of tongues 62 the walls of the channels 58 may be integrated as at 66 to strengthen the part 53, but the relatively thin walls 59 permit expansion and contraction of these walls to suit expansion and contraction of the tongues 62 under the influence of the heat which the machine is designed to create. The shoe holders for a given shaft are desirably staggered circumferentially so that the spaces between the shoes are not aligned with similar spaces on an adjoining shoe holder.

It will be understood that the foregoing description of one of the units applies to each of them.

Thus, by operation of the motor 48 the shafts 34 are all rotated simultaneously and friction produced between the shoe faces 64 and the bore of the jacket 23 heats this jacket rapidly so that the temperature of the water in the container 17 and surrounding the jackets 23 is quickly raised to a useful temperature of say between one hundred fifty and two hundred degrees, or even to boiling temperature. This water may be circulated through the pipe 67 connected with one end of the container 10 and through which it rises by convection to the usual radiators of the rooms or space to be heated. It will be

understood that if it is the intent to circulate steam rather than hot water, the steam will rise through the pipe 67. The return pipe 68 returns the cooled hot water or condensed steam to the container.

In order to prevent an excess of friction between the shoe faces 64 and the bore of the jacket, the jacket of each of the units is desirably filled with oil which may circulate freely through the space between the shoe holders 53 and between the channels 58, and between the shoe faces themselves, and the bore of the jacket.

For heating an additional supply of hot water such as for domestic use in kitchens and bathrooms and the like, an auxiliary tank 69 may be carried by the cover 20 through which water may be circulated through the pipes 70 and 71, the separate supply of water in the tank 69 receiving its heat through the walls of this tank from the water in the container 10.

Such changes may be made as fall within the scope of the following claims without departing from the invention.

Having described my invention, I claim:

1. A friction heater including a rotatable shoe holder and segmental friction shoes carried by the holder with resilient means interposed between the shoes and the holder wherein the shoe holder has a plurality of radially and longitudinally disposed channels, and the segmental shoes have a plurality of longitudinally spaced-apart tongues slidably received in said channels, the said resilient means being arranged between a pair of said tongues for longitudinal retention as well as between said channel walls for lateral retention.

2. A friction heater including a rotatable shoe holder and segmental friction shoes carried by the holder with resilient means interposed between the shoes and the holder wherein the shoe holder has a plurality of radially and longitudinally disposed channels, and the segmental shoes have a plurality of longitudinally spaced-apart tongues slidably received in said channels, the said resilient means being arranged between a pair of said tongues for longitudinal retention as well as between said channel walls for lateral retention, and wherein the channel walls are relatively thin whereby expansion and contraction under the influence of heat is permitted.

3. In a friction water heater having a water container, the combination with a hollow heat exchange member and a rotatable shaft therein passing into the container, of a shoe holder keyed on said shaft and having a plurality of radial arms, a friction shoe carried by each arm, interengaging means on the shoe and arm whereby the shoes are radially movable on said holder, and compression springs between each shoe and the holder urging the shoes against the inner surface of said heat exchange member.

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