Aug. 13, 1963 F. G. MARRUJO 3,100,523

HEAT EXCHANGER

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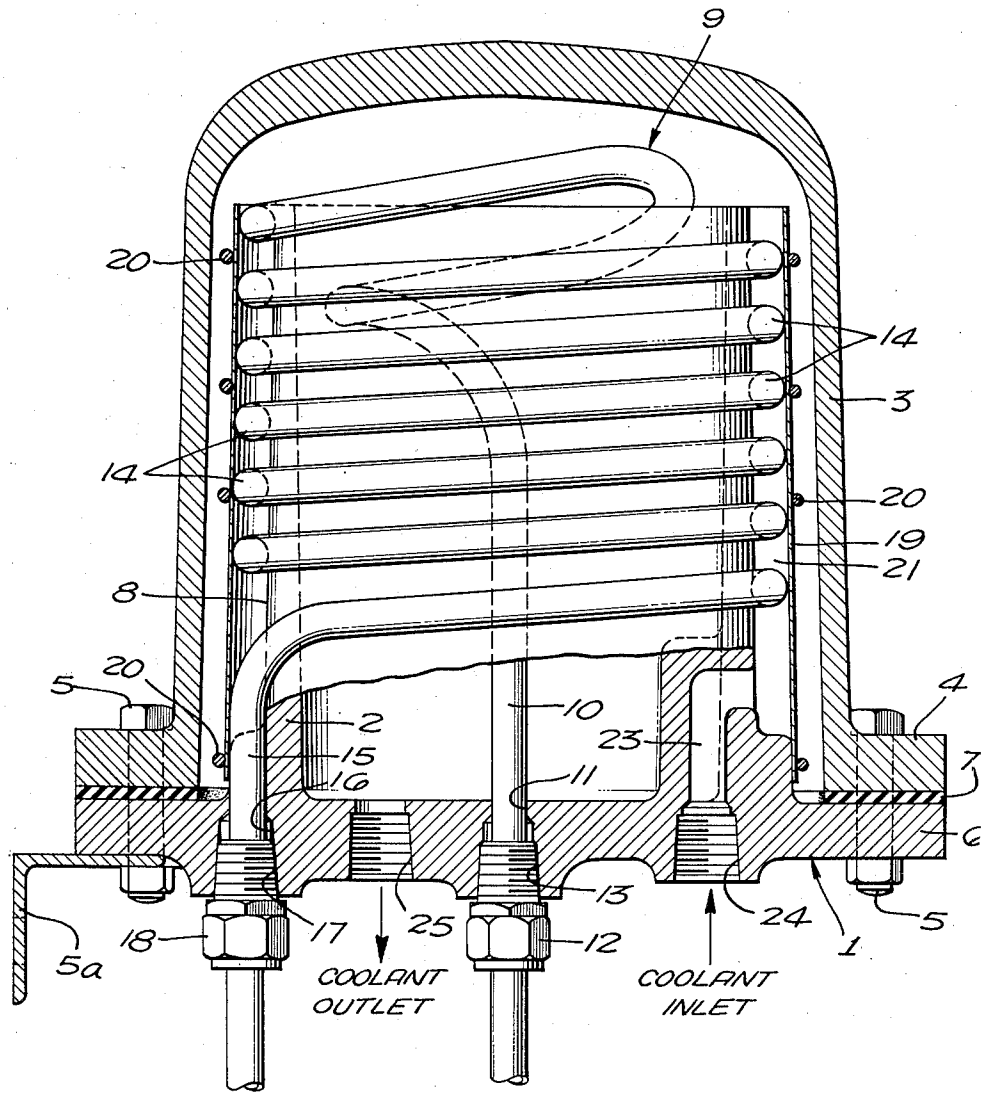


FIG. 1.

FERNANDO G. MARRUJO
INVENTOR.

BY
Allen B. Hamilton
ATTORNEY

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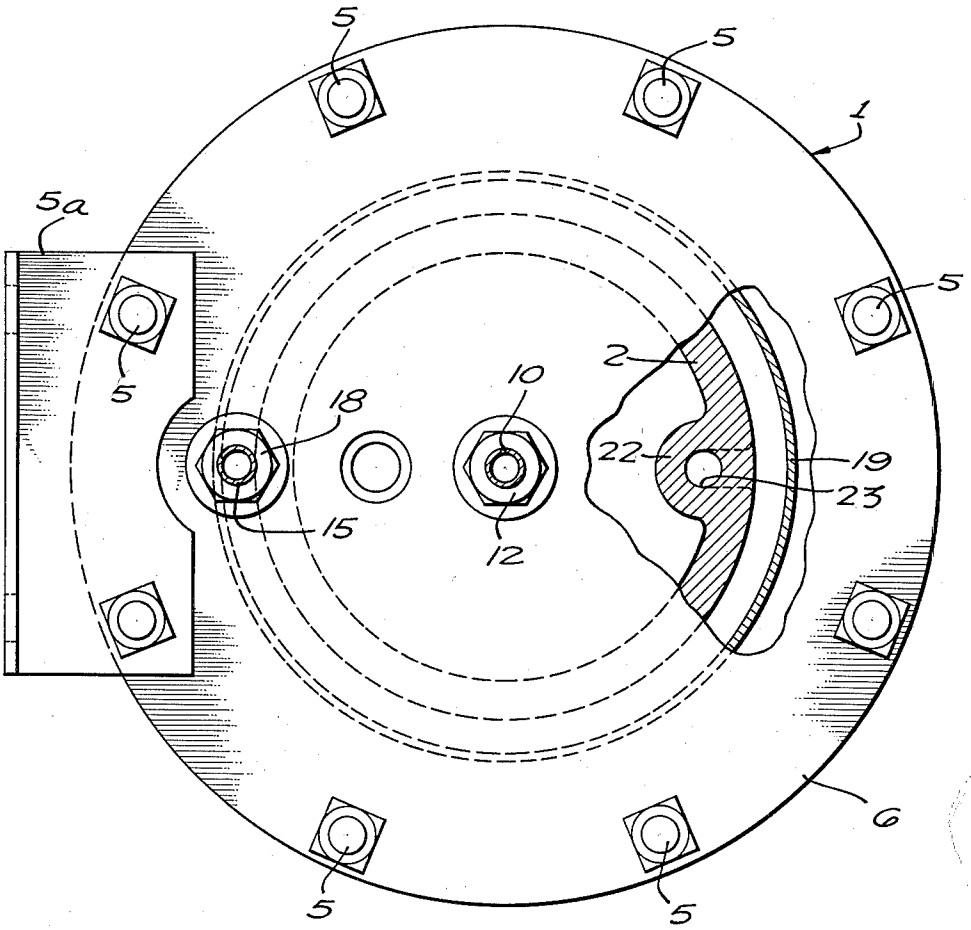


FIG. 2.

FERNANDO G. MARRUJO
INVENTOR.

BY
Allen & Hamby
ATTORNEY

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HEAT EXCHANGER

Fernando G. Marrujo, Montebello, Calif., assignor to Borg-Warner Corporation, Chicago, Ill., a corporation of Illinois

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5 Claims. (Cl. 165—160)

The present invention relates to heat exchangers of the helical coil type, and more particularly to such a heat exchanger which is extremely simple to manufacture and maintain.

Heretofore it has been the practice to provide heat exchangers including an elongated coil for the flow of fluid to be cooled, which coil is disposed within a housing through which a cooling fluid is circulated. In those applications where the coil is subjected to relatively high order internal pressures, the coolant circulating housing has also been subjected to approximately equally high order pressures in order to offset the internal pressure effect in the coil.

The present invention contemplates a heat exchanger which avoids the necessity of maintaining high pressure cooling fluid within the housing and which affords improved means for cooling the coil, with consequent cooling of the fluid circulating through the latter.

In addition, the invention has as an objective the provision of a heat exchanger in which the housing may be removed so as to permit ease of cleaning of the cooling fluid path about the heat exchanger coil.

Another object of the invention is to provide a heat exchanger of the helical coil type in which the coil is supported in an extremely simple manner so as to constrain the same against distortion due to high internal pressure surges, while at the same time providing an effective cooling flow path through the coil.

Other objects and advantages of the invention will be hereinafter described or will become apparent to those skilled in the art, and the novel features of the invention will be defined in the appended claims.

In the accompanying drawings:

FIG. 1 is a vertical sectional view through a heat exchanger made in accordance with the invention, with certain of the parts shown in elevation; and

FIG. 2 is a bottom plan view, with a portion broken away and shown in section.

Like reference characters in the views of the drawings and in the following detailed description designate corresponding parts.

Referring first to FIG. 1, it will be noted that the heat exchanger comprises a base generally designated **1**, having preferably integrally formed therewith an upstanding tubular or generally cylindrical wall **2** about its outer periphery. The base **1** supports a bell-like housing **3** having a lower marginal flange **4** adapted to be secured as by fasteners **5** to the outer periphery **6** of the base **1**. An appropriate supporting bracket **5***a* may be secured to the base **1** by means of the fasteners **5** so that the heat exchanger assembly may be appropriately supported in a desired location.

Preferably there is interposed between the flange **4** and the margin **6** of the housing **3** and base **1** respectively, a sealing gasket **7** to prevent the leakage of cooling fluid from within the housing.

The cylindrical wall **2** has an external tapered surface **8**, about which is disposed a helically wound conduit or heat exchanger coil **9**. The coil **9** is preferably so wound as to have a section **10** extending generally coaxially of the coil and through a bore **11** centrally of the base **1**, this section **10** being effectively sealed in the base by a threaded plug **12** engaged in a tapped tapered opening **13**.

The coil **9** leads from the section **10** through a series

of coils **14** to a coil section **15** extending substantially parallel to the section **10** and in spaced relation thereto. This section **15** extends through a bore **16** in the base **1**, which is adapted as at **17** for the reception of a sealing and retainer plug **18**.

Accordingly, fluid to be cooled may circulate through the coils **14** to and from the sections **10** and **15** of the heat exchanger coil.

Surrounding the coils **14** is a sheet metal sleeve **19** which is retained in contact with the coils **14** by a suitable plurality of encompassing bands or wires **20**.

Accordingly it will be noted that between the outer wall **8** of the tubular supporting section **2** and the sleeve **19**, a helical flow path **21** is defined by the adjacent coil windings **14**. Means are provided for circulating a cooling fluid through this helical flow path **21**.

The base **1** is provided with an internal enlargement **22**, through which extends a flow passage **23** leading from a threaded opening **24** to the space between the tubular support **2** and the coil constraining sleeve **19**. As indicated by the arrow in FIG. 1, this passageway **23** constitutes a cooling fluid inlet from which cooling fluid passing into the housing **3** may flow upwardly through the helical flow path **21**, so as to be discharged at the upper end of the latter into the housing **3**.

Within the tubular support **2** there is a cooling fluid outlet **25**, whereby such cooling fluid is permitted to pass from the housing **3**.

From the foregoing description it will be apparent that the housing **3** may be removed from the base **1** without disturbing the disposition of the coils **14** about the supporting section **2** of the base. In addition, since the coils **14** are wrapped about a vertical tapered section **8** of the supporting section **2**, the constraining sleeve **19**, which is correspondingly tapered, may be removed from the coils **14** to permit cleaning of the fluid flow path **21** between the coils **14** in the event that such flow path should be clogged.

Further it will be noted that since the coils **14** are physically constrained between the sleeve **19** and the supporting tubular section **2** of the base, it is not necessary that the housing **3** contain cooling fluid under high pressure, or under pressure of such high order as may be circulated through the heat exchanger coil **9**.

While the specific details of the invention have been herein shown and described, changes and alterations may be resorted to without departure from the spirit of the invention as defined in the appended claims.

I claim:

1. A heat exchanger comprising: a base, a housing removably disposed upon said base, said base having a tubular support extending into said housing, a heat exchanger coil having a section extending through said base within said tubular support, a plurality of coils disposed about the tubular support in engagement with said support and a section extending through said base externally of said tubular support, a sleeve surrounding said coils in engagement therewith so as to form with said tubular support a helical cooling fluid flow path leading between said coils, said base having an inlet leading to the space between said tubular support and said sleeve, and an outlet leading from said housing.

2. A heat exchanger as defined in claim 1, wherein said outlet leads through said base within said tubular support.

3. A heat exchanger as defined in claim 1, including a band embracing said sleeve to constrain the same into engagement with said coils.

4. A heat exchanger as defined in claim 1, wherein said tubular support is provided with an outer wall tapering away from said base.

5. A heat exchanger comprising: a base; a housing re-

movably connected to said base; said base having a tubular support disposed centrally of said housing; a heat exchanger conduit having an end extending through said tubular support and outwardly through said base and an end extending through said base externally of said tubular support, and a section intermediate said ends including coils disposed about said tubular member in engagement therewith; a sleeve disposed about said tubular support in spaced relation thereto and in engagement with said coils and defining with said coils and said tubular support a helical fluid flow passage; said base having an outlet port and an inlet port leading into the space between said tubular support and said sleeve, whereby a heat transfer fluid may flow into said space and pass through said helical flow passage and thence through said tubular support to said outlet port, and conduit coupling means on the ends of said conduit externally of said base.

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