Sept. 20, 1971 R. L. BRUNELL 3,605,874

ELEMENT BASKET

Filed Oct. 15, 1969

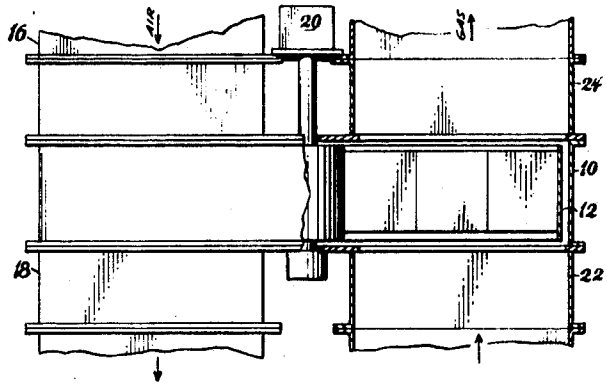


Fig. 1

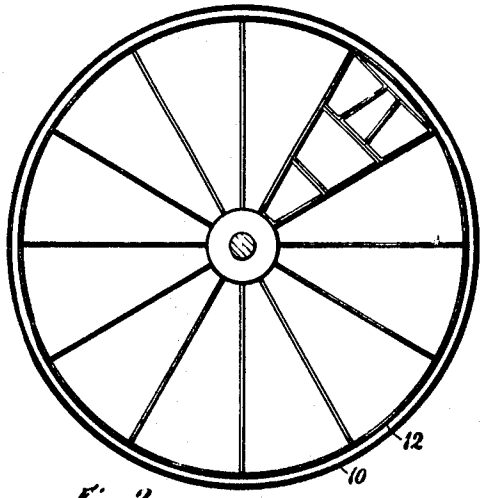


Fig. 2

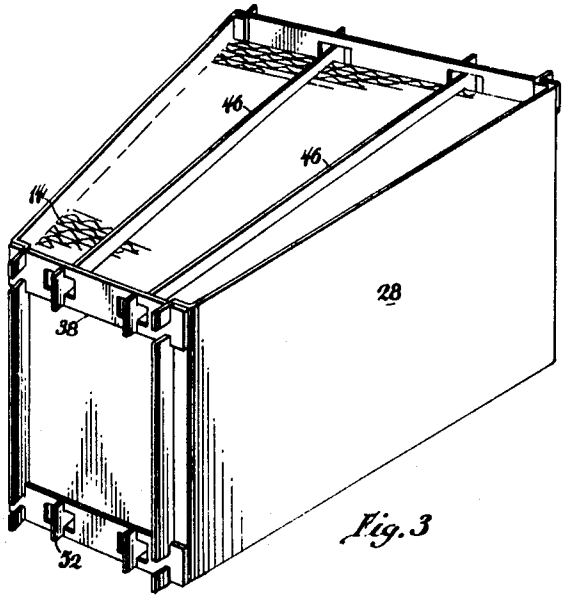


Fig. 3

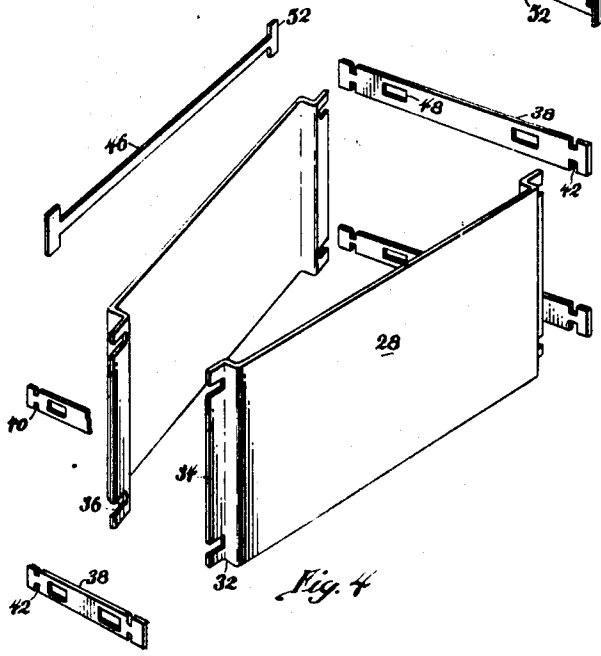


Fig. 4

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ELEMENT BASKET

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U.S. Cl. 165—9 2 Claims

ABSTRACT OF THE DISCLOSURE

A basket for a mass of heat absorbent element contained in a rotor of a rotary regenerative heat exchanger. The basket is comprised of uniformly sized components that may be readily formed and stockpiled, and easily assembled into an effective container for the element.

BACKGROUND OF THE INVENTION

The present invention relates to an element basket or container for the heat absorbent element of rotary regenerative heat exchanger. More particularly, the present invention is directed to a basket having side walls of a uniform size and shape for use interchangeably throughout the heat exchanger. Inasmuch as only one type of side wall is required for all baskets used throughout the heat exchanger in any of various different locations, the components may be readily stockpiled. Since the parts of the basket include a self-locking feature no welding is necessary to hold the basket in its assembled form, the components may be rapidly and economically assembled into an effective basket.

DESCRIPTION OF PRIOR ART

In various applications utilizing a rotary regenerative heat exchanger the heat absorbent element thereof is enclosed in a preformed "basket" of the type shown in U.S. Pat. No. 2,432,198. Each such basket comprises an enclosure for the element formed of imperforate plate with ends thereof open to permit the free flow of gas and air therethrough. Inasmuch as baskets of this type are used at radially different locations within the rotor of a heat exchanger, the curvature, size and shape are forced to differ accordingly. Thus, it is not uncommon for a heat exchanger to require four or more different sizes and shapes of baskets for utilization within a particular rotor. Since each basket usually comprises a completely welded metallic enclosure, the costs of forming welding and stockpiling baskets thus made are extremely excessive.

SUMMARY OF THE INVENTION

The present invention therefore relates to a basket-like enclosure for the heat absorber element of a rotary regenerative heat exchanger.

More particularly, the present invention relates to a basket for the rotor of a rotary regenerative heat exchanger that utilizes uniformly sized side walls for substantially all applications, only the radially spaced bars which connect the sidewalls together to form the baskets must vary to form differently sized baskets for use in the different locations within the rotor. Moreover, the parts are adapted to be assembled without any or at least a minimum of welding, whereby a completed basket will require much less time and skill for its construction.

A more complete understanding of my invention may be realized by referring to the following description which may be viewed in conjunction with the accompanying drawings in which:

FIG. 1 is a sectional view of a rotary regenerative heat exchanger,

FIG. 2 is a plan view of the rotor showing the section shaped compartments,

FIG. 3 is a perspective view of an assembled basket, and

FIG. 4 is a perspective view in "exploded" form of an element basket according to my invention.

As illustrated in the drawing, a housing **10** enclosing a rotor having a shell **12** containing a mass of heat exchange material or plates **14** is contacted by a stream of hot air or other gases entering the housing through air inlet duct **16** and is exhausted to an outlet duct **18** after having traversed the heat exchange material in the compartments therebetwen. Cool air or other gas entering the housing through an inlet **22** is also exhausted to an outlet duct **24** after having traversed the heat absorbent material of the rotor. While the gas and air are being directed through their particular passageways of the rotor, the rotor is being continuously rotated about its central axis by a drive means **20** in order that each part of the heat exchange element contained in the rotor may be alternately aligned with the different ducts and subjected to the hot gases and the cooler air.

The heat exchanger material carried by the rotor comprises essentially a mass of heat absorbent plates **14** placed in juxtaposition with projections on the plates or other spacers provided to form fluid passageways therebetween for the flow of the several fluids. The plates or elements **14** are assembled in an orderly manner in an enclosure or basket **20** that firmly holds the plates in a predetermined relationship in order that a large number of plates may be handled together as an integral unit when assembled into the rotor of a rotary regenerative heat exchanger.

In accordance with this invention, each basket comprises a pair of side walls **28** preferably formed as stampings from suitable metallic plate. The side walls are of uniform size and shape and include a uniform "offset" portion **32** at each end thereof which carries an end flange **34** normally thereto. Each end flange **34** is formed to include a notch **36** adjacent its upper and lower ends to receive the oppositely notched ends of transverse tension bar **38**. The ends of the bar **38** have notches **40** directed from opposite sides thereof to form a neck portion **42** sized to fit into notches **36** of the side walls **28**. Thus, placing the neck **42** of each tension bar in the proper notch **36** of the side walls will hold the side walls in position and thus provide a suitably sized enclosure or basket for the heating element. The size of the basket may be easily varied by using tension bars of various lengths to accommodate the change of basket size required as you go radially from the center of the rotor to the outer shell.

After the basket so constructed has been filled with a suitable number of heat absorbent element plates, at least one holding bar **46** is passed across the top and the bottom of each basket and secured at opposite ends thereof to said tension bars to maintain them tightly in their respective notches and thus hold the basket in its desired form. Moreover, when the holding bars are in position they hold the heat absorbent plates or other type element tightly packed within the basket so that it may be tipped or even upset without disturbing the element therein.

To this end one or a plurality of holding bars **46** are inserted through elongated slots **48** in the tension bars **38** at opposite ends of the basket and turned approximately 90° to lock the elongate tabs **52** outside the slots. A simple tack-weld may be used to secure the tab **52** to the tension bar **38** to make the basket a stable unit that may be easily handled when it is shipped or installed.

In their unassembled form the units comprising the basket may be easily stockpiled, for only the tension bars **38** need be varied in length to change the overall size and

shape of the basket to fit the particular application intended.

The baskets may be arranged singly or in multiple units to provide maximum utilization of the space available. Thus the radially inner compartments of a rotor may be arranged to contain a single basket while the outer peripheral compartment may be occupied by multiple baskets in the manner shown in FIG. 2.

I claim:

1. An element bundle for a heat exchanger including a plurality of element sheets lying in lateral juxtaposition and spaced apart to permit the flow of fluid therethrough, a basket for said element sheets comprising in combination a pair of lateral side walls with notched ends positioned adjacent side edges of said element sheets, tension bars releasably joining notched ends of the lateral side walls to hold them continuously adjacent edges of said element sheets, and holding bars at opposite ends of the bundle of element sheets, having interlocking ends connecting spaced tension bars to form an enclosure at all sides of the element bundle.

2. An element bundle for a heat exchanger having a plurality of element sheets lying in lateral juxtaposition and spaced apart to permit the flow of fluid therethrough,

a basket enclosing said element sheets comprising in combination a pair of lateral side walls with locking means at the ends thereof positioned adjacent side edges of said element sheets, tension bars joining locking means at the ends of the lateral side walls to form an enclosure surrounding said sheets and holding the side walls to form an enclosure holding the side walls continuously adjacent the edges of said element sheets, and at least one holding bar at each of the opposite ends of the bundle of element sheets including a fixture interlocked with spaced tension bars at the ends of the basket adapted to hold the tension bars integral with the side walls and simultaneously maintain the element sheets within the basket.

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ALBERT W. DAVIS, JR., Primary Examiner

U.S. Cl. X.R.

165—10