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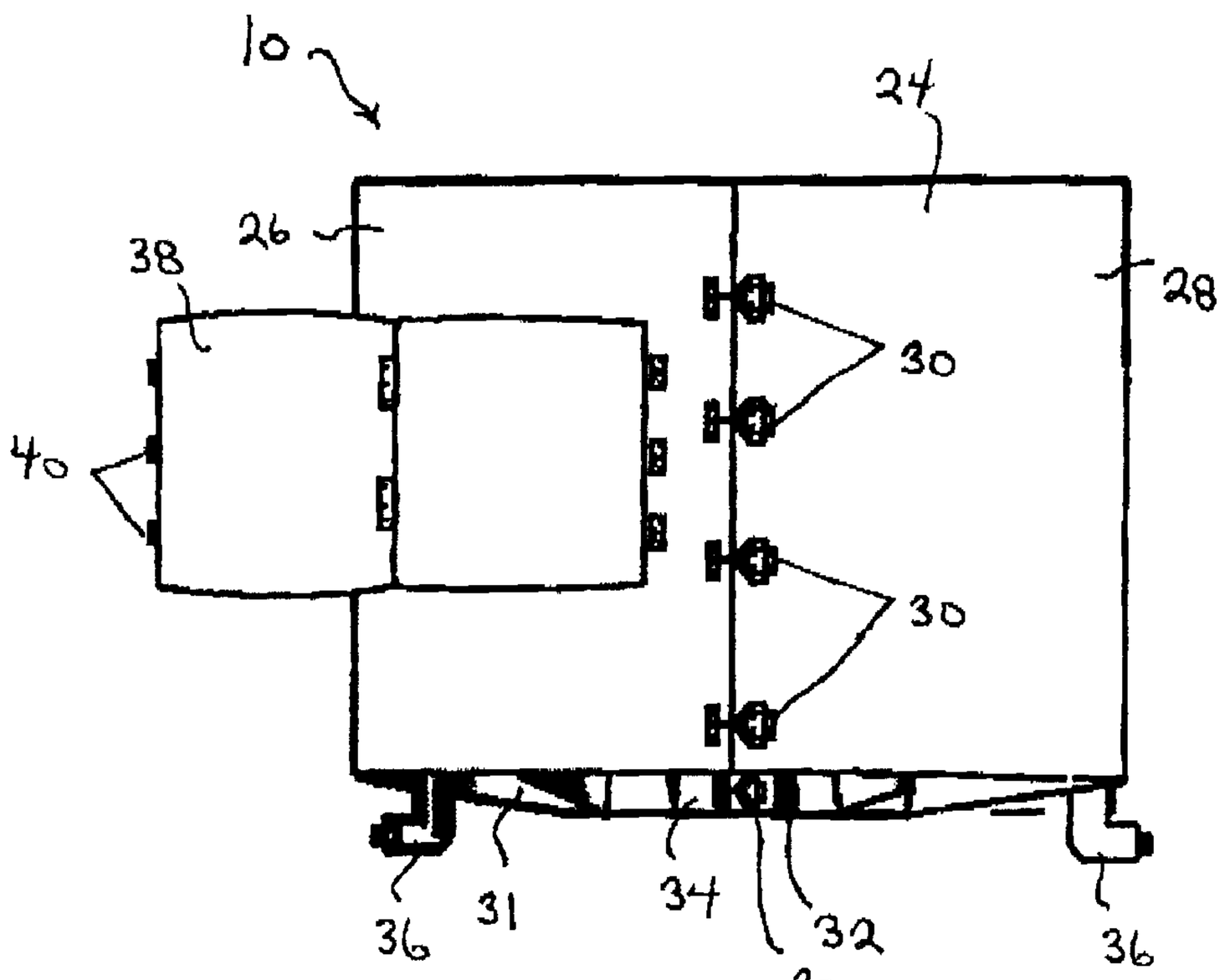
(54) Titre : ENCEINTE DE CONFINEMENT DES FLUIDES DE FORAGE POUR TETE ROTATIVE
(54) Title: DRILLING LIQUID CONTAINMENT APPARATUS FOR A ROTATING HEAD



(57) Abrégé/Abstract:
A method and apparatus of drilling fluid containment on a rotating head. Firstly, provide a cylindrical shell separable into two detachably secured halves. The cylindrical shell has a fluid circulation port and an access door. Secondly, securing the cylindrical shell to a rotating head by assembling the two detachably secured halves around the rotating head and clamping a flange onto a stationary portion of the rotating head.

ABSTRACT OF THE DISCLOSURE

A method and apparatus of drilling fluid containment on a rotating head. Firstly, provide a cylindrical shell separable into two detachably secured halves. The cylindrical shell has a fluid circulation port and an access door. Secondly, securing the cylindrical shell to a rotating head by assembling the two detachably secured halves around the rotating head and clamping a flange onto a stationary portion of the rotating head.

TITLE OF THE INVENTION:

drilling fluid containment apparatus for a rotating head

NAME OF INVENTOR:

Quinn Holtby

FIELD OF THE INVENTION

The present invention relates to a drilling fluid containment apparatus for a rotating head used in drilling oil and gas wells.

BACKGROUND OF THE INVENTION

There are several companies manufacturing rotating heads which are used in drilling oil and gas wells. One such company is Williams Tool Co, Inc.

The William rotating head is capable of rotating a drill string at speeds approaching 100 rotations per minute.

Existing drilling fluid containment systems cannot be used on the Williams rotating head, as a portion of the head rotates, and access to the rotating head is required when adding and removing lengths of pipe. Without a containment system, drilling fluid is lost each time lengths of pipe are added or removed from the drill string. In addition to obvious financial and environmental concerns, this loss of drilling fluid is creating a serious safety concern. The current trend in the oil and gas industry is underbalanced drilling. With underbalanced drilling formation pressure exceeds the pressure in the well bore. In order to avoid a blow out situation the suppressing ability of the column of drilling fluid in the well

bore must be closely monitored. It is important to be able to accurately calculate the amount of drilling fluids in the well bore. With an undetermined loss of drilling fluid occurring, accurate calculations become impossible.

SUMMARY OF THE INVENTION

What is required is a drilling fluid containment apparatus suitable for use on a rotating head.

According to one aspect of the present invention there is provided a drilling fluid containment apparatus for use with a rotating head, including a cylindrical polymer plastic shell separable into two detachably secured halves. The cylindrical shell has a bottom with a central opening. The central opening has a depending clamping flange with compressible seal. The cylindrical shell has at least one fluid circulation port and at least one access door.

According to another aspect of the present invention there is provided a method of drilling fluid containment on a rotating head. Firstly, provide a cylindrical shell separable into two detachably secured halves. The cylindrical shell has a bottom with a central opening. The central opening has a depending clamping flange. The cylindrical shell has at least one fluid circulation port and at least one access door. Secondly, securing the cylindrical shell to a rotating head by assembling the two detachably secured halves around the rotating head and clamping the flange onto a stationary portion of the rotating head.

The present invention addresses a number of problems which prevented fluid containment apparatus from being used on a rotating head. The problem of attachment is solved by using a clamping flange which clamps onto a very narrow band of available space on the stationary portion of the rotating head.

No attempt is made to attach any portion of the fluid containment apparatus to the rotating portion. The rotating portion is, however, surrounded by the two halves of the cylindrical shell. Drilling fluid is captured within the cylindrical shell and circulated through the fluid circulation port. As all the drilling fluid is captured, an accurate determination of drilling fluid volumes can be maintained as part of blow out prevention monitoring. The second problem of access, is addressed by providing at least one and, preferably two, access doors on the cylindrical shell.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features of the invention will become more apparent from the following description in which reference is made to the appended drawings, wherein:

FIGURE 1 is a side elevation view of a rotating head manufactured by Williams Tools Co., Inc., labelled as **PRIOR ART.**

FIGURE 2 is a side elevation view of a drilling fluid containment apparatus constructed in accordance with the teachings of the present invention.

FIGURE 3 is a side elevation view of the drilling fluid containment apparatus illustrated in **FIGURE 2**, positioned on the rotating head illustrated in **FIGURE 1.**

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The preferred embodiment, a drilling fluid containment apparatus generally identified by reference numeral 10, will now be described with reference to **FIGURES 1** through **3.**

Drilling fluid containment apparatus 10 is intended for use with a rotating head. Referring to **FIGURE 1**, which is labelled **PRIOR ART**, a rotating head 12 is illustrated. The

particular rotating head 12 illustrated is one manufactured by Williams Tool Co., Inc. The parts of rotating head 12 which must be identified in order to describe the function and utility of drilling fluid containment apparatus 10, include a stationary portion 14 and a rotating portion 16. Rotating portion 16 rotates at speeds of approximately 100 r.p.m. Stationary portion 14 has a bottom flange 18 and a radial flange 20. Bottom flange 18 is used to secure rotating head 12 to a well head (not shown). Radial flange 20 is used to connect rotating head 12 to a drilling fluid circulation system (not shown). A latching system 22 is provided on stationary portion 14 which is used when adding or removing lengths of pipe.

Referring to **FIGURE 2**, drilling fluid containment apparatus 10 includes a cylindrical polymer plastic shell 24. Cylindrical shell 24 is separable into two detachably secured halves 26 and 28. A series of latches 30 are used to maintain halves 26 and 28 secured together. Cylindrical shell 24 has a bottom 30 with a central opening 32. Central opening 32 has a depending clamping flange 34. Clamping flange 34 is sized to fit on stationary portion 14 of rotating head 12, as will hereinafter be further described. Clamping flange 34 includes a compressible seal (not shown). Cylindrical shell 24 has at least one, and preferably two, fluid circulation ports 36. Cylindrical shell 24 also has at least one, and preferably two access doors 38. Access doors 38 have latches 40 to maintain them in the locked position when not in use.

The preferred method of drilling fluid containment for a rotating head involves the following steps. Firstly, referring to **FIGURE 2**, providing a drilling fluid containment apparatus 10, substantially as described. Secondly, referring to **FIGURE 3**, securing cylindrical shell 24 to rotating head 12 by assembling two detachably secured halves 26 and 28 around rotating head 12 and clamping flange 34 onto stationary portion 14 of rotating head 12. As will be apparent by a comparison

of **FIGURES 1** and **3**, flange 34 clamps onto a very narrow band of available space on above bottom flange 18 and radial flange 20 and below latching system 22 on stationary portion 14 of rotating head 12. Once clamped in position, rotating portion 16 of rotating head 12 is surrounded by halves 26 and 28 of cylindrical shell 24. Drilling fluid is captured within the cylindrical shell and circulated through fluid circulation ports 36 back into the drilling fluid circulation system where it can be accurately monitored. With fluid containment apparatus 10 installed, access can still be obtained to latching assembly 22 of rotating head 12 through access doors 38 of cylindrical shell 24.

At the location in which drilling fluid containment apparatus 10 is to be installed, it is extremely difficult, if not impossible, to position and use lifting equipment. The installation of drilling fluid containment apparatus 10 must, therefore, be done manually. This places an added importance upon the use of polymer plastic for cylindrical shell 24, instead of steel or cast iron. The proto-type units for cylindrical shell 24 weigh approximately 80 pounds. This is roughly 1/10th the weight of an equivalent metal containment, which would weight 800 pounds. The dimensions of the space into which cylindrical shell 24 must fit varies from rig to rig. Having cylindrical shell 24 made of polymer plastic enables trimming to take place on site. It has also, on occasion enabled cylindrical shell 24 to be forced into position by bending of cylindrical shell 24. This type of <u>in situ</u> fitting of cylindrical shell 24 to suit the application is not possible with metal. If cylindrical shell 24 were made of metal, the weight cylindrical shell 24 could not be supported by clamping flange 34. In order to have an effective seal, it is important that a compressible seal medium be used. The sealing surface provided on the rotating head is extremely rough. In some installations, the words "WILLIAMS" were embossed across the sealing surface. It is, therefore, important that the seal be capable of filling in the crevices.

Working in the confined space under the drilling rig floor, it can be difficult to support the weight, align holes, and insert bolts. It is, therefore, preferred that latches 30 be used to hold halves 26 and 28 together. In the event of a blow out, access must be obtained to the rotating head. Polymer plastic shell 24 melts away, to provide such access.

It will be apparent to one skilled in the art that modifications may be made to the illustrated embodiment without departing from the spirit and scope of the invention as hereinafter defined in the Claims.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

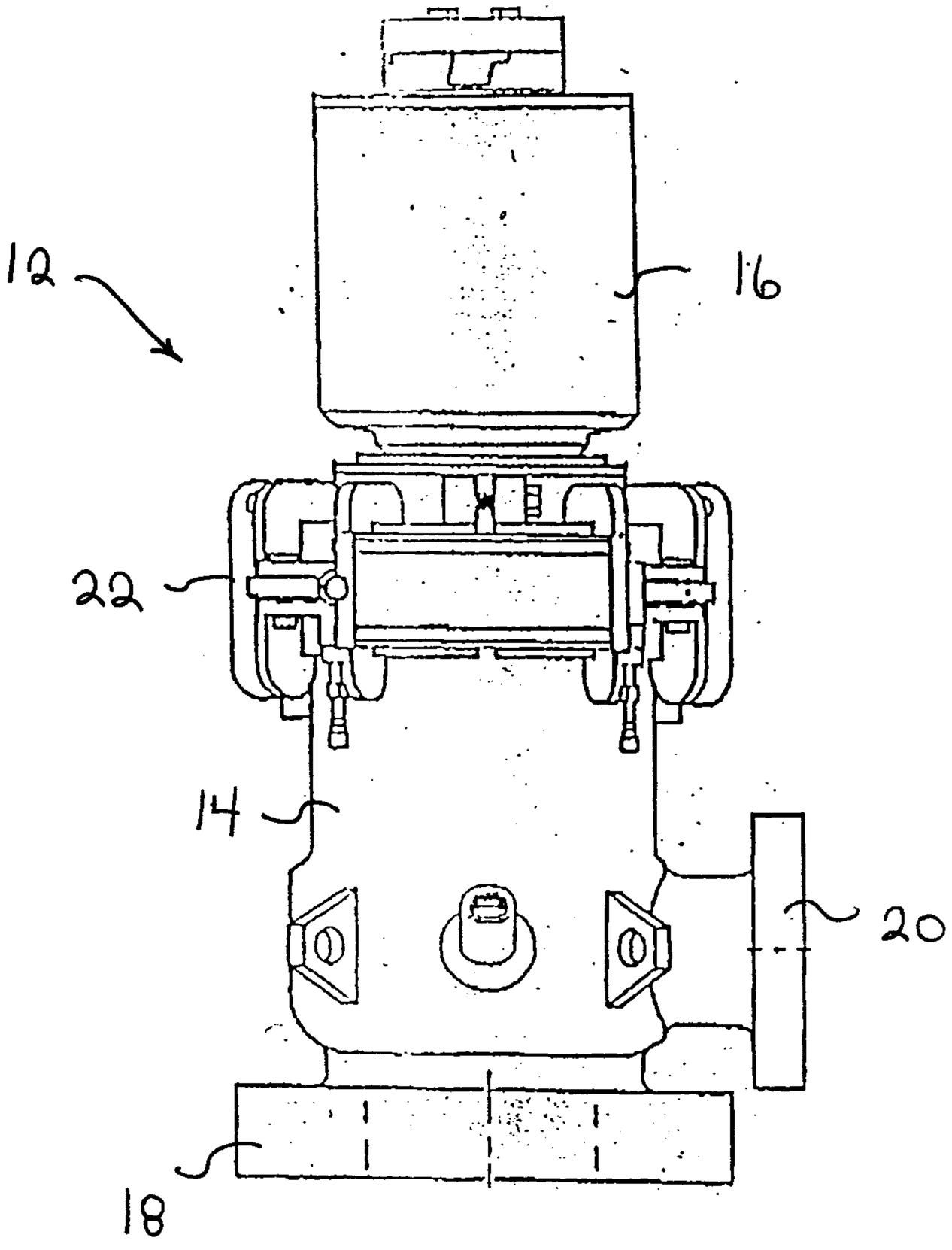
1. A drilling fluid containment apparatus for use with a rotating head, comprising:

a cylindrical polymer plastic shell separable into two detachably secured halves, the cylindrical shell having a top with a central opening, a bottom with a central opening, the central opening on the bottom having a depending clamping flange with compressible seal, the depending clamping flange adapted to be clamped to a stationary portion of the rotating head, the cylindrical shell having at least one fluid circulation port and at least one access door.

2. A method of drilling fluid containment on a rotating head, comprising the steps of:

firstly, providing a cylindrical polymer plastic shell separable into two detachably secured halves, the cylindrical shell having a bottom with a central opening, the central opening having a depending clamping flange with compressible seal, the cylindrical shell having at least one fluid circulation port and at least one access door; and

secondly, securing the cylindrical shell to a rotating head by assembling the two detachably secured halves around the rotating head and clamping the flange onto a stationary portion of the rotating head.



PRIOR ART

FIGURE 1

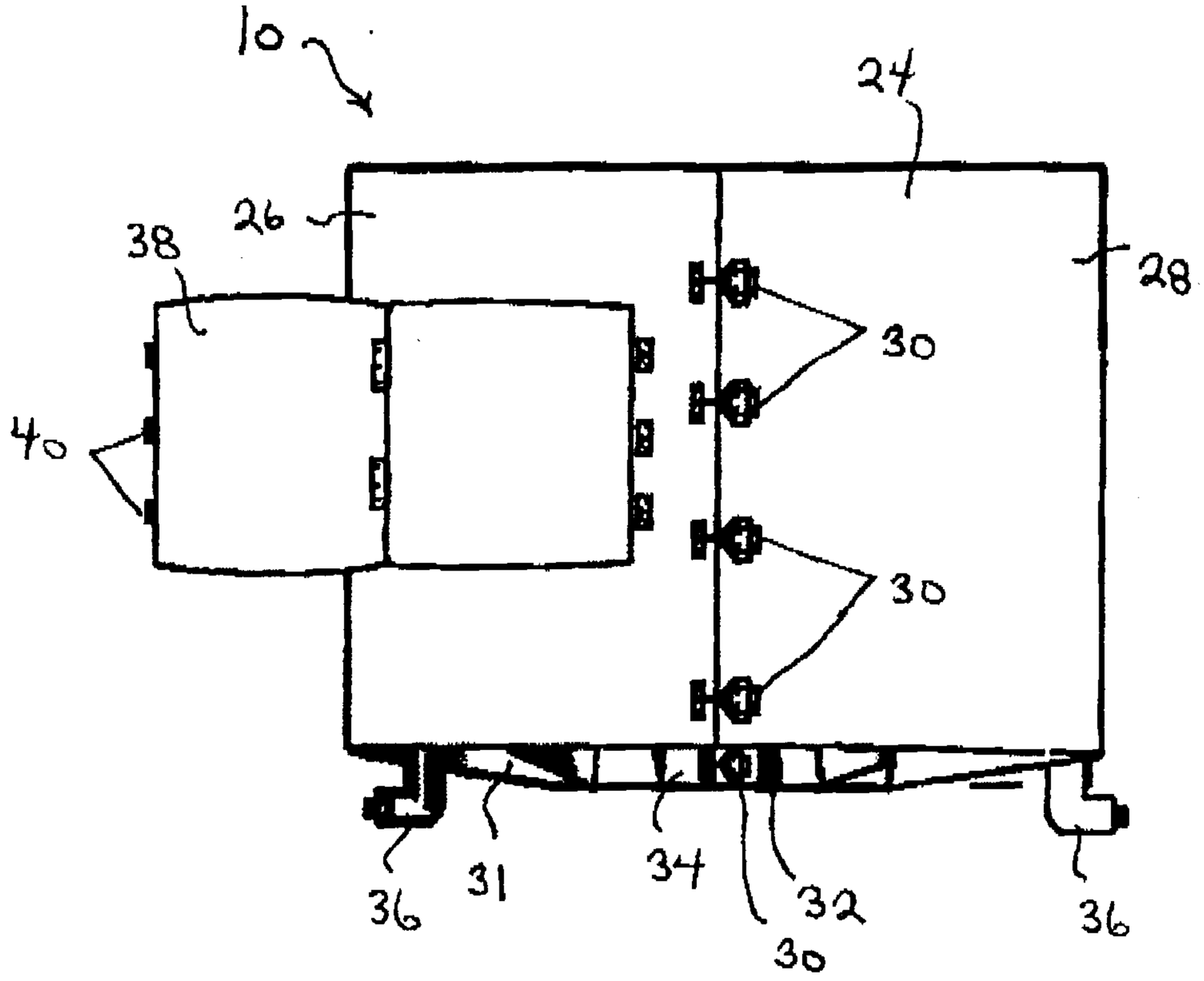


FIGURE 2

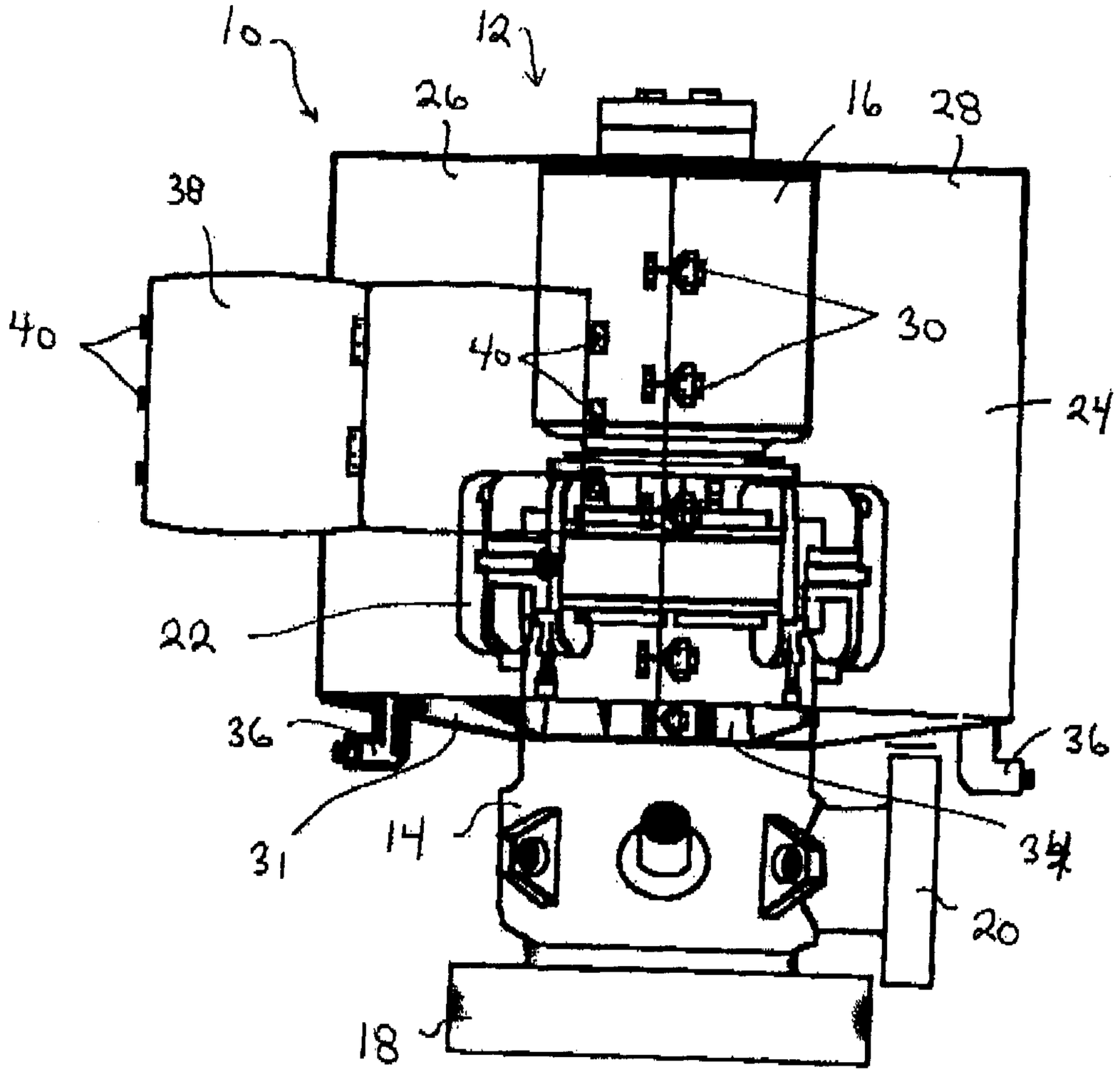
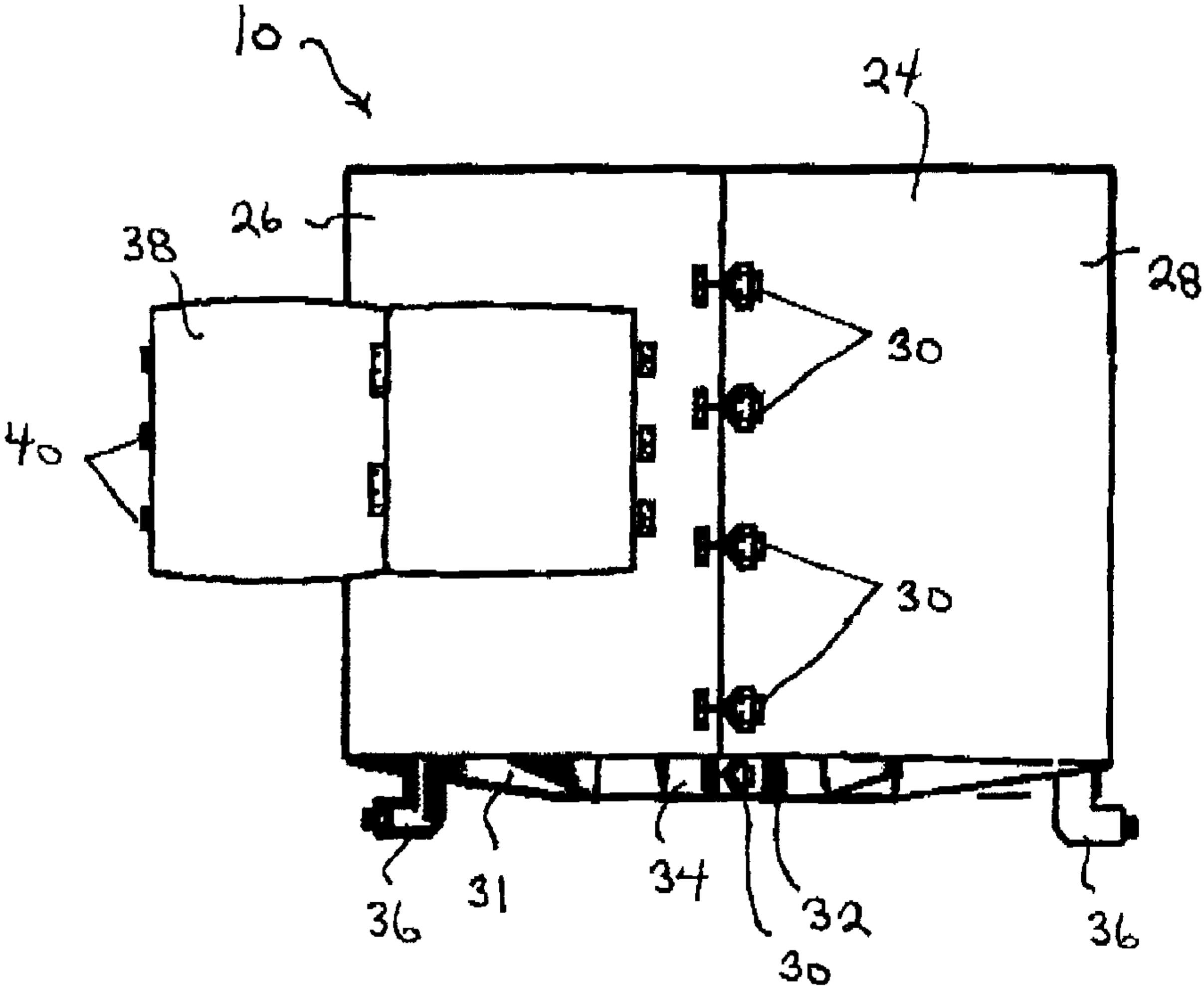


FIGURE 3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