June 11, 1957 R. L. CAWOOD 2,795,349

COVER PLATE CLOSURE

Filed Feb. 12, 1954

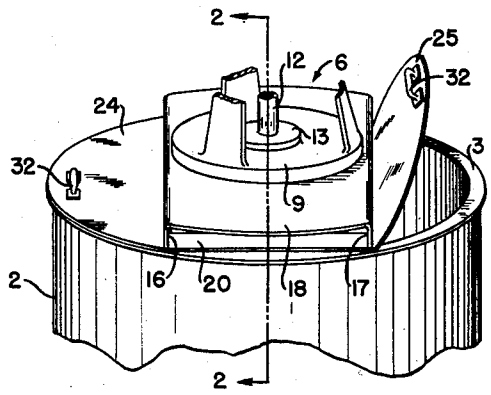


FIG. 1

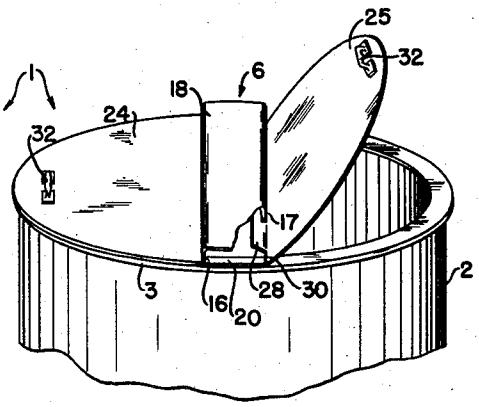


FIG. 4

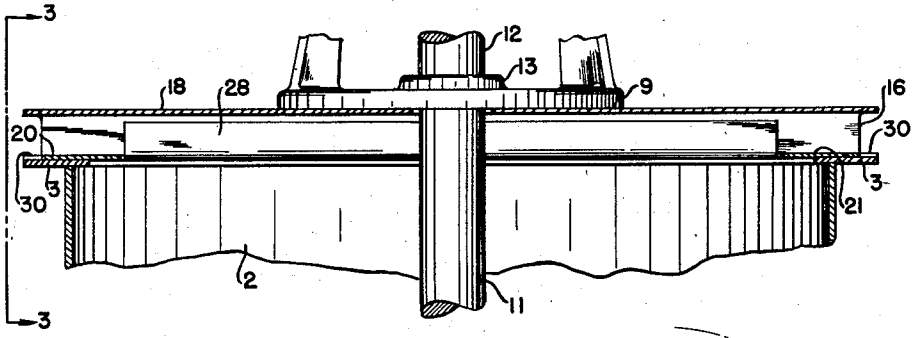


FIG. 2

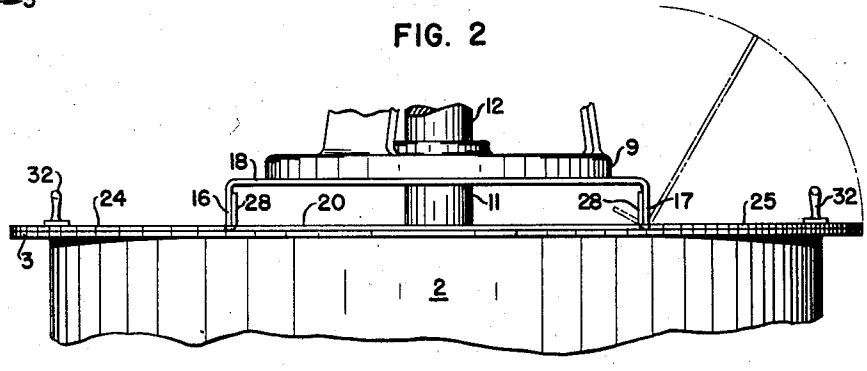


FIG. 3

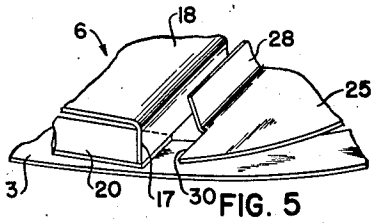


FIG. 5

INVENTOR.
RICHARD L. CAWOOD

BY

Pennie, Edmonds, Morton, Barrows & Taylor

ATTORNEYS

United States Patent Office 2,795,349 Patented June 11, 1957

2,795,349

COVER PLATE CLOSURE

Richard L. Cawood, East Liverpool, Ohio, assignor to The Patterson Foundry & Machine Co., East Liverpool, Ohio, a corporation of Ohio

Application February 12, 1954, Serial No. 409,880

6 Claims. (Cl. 220—31)

This invention relates to top closures for vessels of the type used in stirring or treating various materials such as vessels for mixing chemicals, and the like, and has for its object the provision of an improved closure for such vessels. More particularly, the invention provides a closure comprising in combination a supporting member which lies over and spans the open top of the vessel and has at least one depending flange, and at least one cover plate supported on edge portions of the vessel while being pivotally connected to the depending flange and readily detachable therefrom.

Ordinarily the covers for mixing tanks of relatively large diameters require adequate support, especially where the tanks are made of comparatively light gauge material. In this connection the usual practice involves the welding of structural members such as angle irons across the open end of the tank to provide adequate support for the cover thereof. This arrangement increases over-all costs of the mixing vessel and induces a load additional to the load of the vessel's agitating means, usually located above its open end.

Further expense is incurred where hinges are incorporated on the cover plate to facilitate access to the mixing vessel. Besides additional costs to the cover plates by use of such hinged construction, a space normally occurs between the cover plate and the element to which it is hingedly connected. Elimination of such spaces as occur at these hinged connections frequently promotes efficiency and all around economy.

The improved closure of my invention comprises at least one self-supporting cover plate which avoids the necessity for using re-enforcing angles and the like at the open end of the vessel, while at the same time avoiding the difficulties and expense incurred in using a hinged connection for the cover plate. The invention includes a cover plate supporting member constructed to lie across the open top of the vessel and having at least one, and advantageously two depending flanges preferably extending across the vessel. One practical and preferred form of supporting member is an ordinary standard ship channel which provides a flat supporting top for motors, agitators, etc., and depending flanges for effecting engagement with the cover plates. The cover plate or plates, as the case may be, lie across the open end of the vessel at the side of the channel flanges, with the rim of the vessel usually arranged to underlie the periphery of each cover plate. Each cover plate has an edge portion underlying a lower edge portion of each channel flange. Each cover plate also has a flange extending upwardly from the edge portion of the cover plate which hooks inside a channel flange and engages the inner face thereof.

When using a channel as a supporting member, the ends of the lower edge portions of the channel flanges have transverse bearing plates attached thereto which engage the top of the vessel and hold the supporting member above the vessel top edge a distance equal to the thickness of the cover plate. The supporting member is

mounted over the vessel so that the top of the cover plate is in close contact with one of the lowermost edges of the supporting member when the cover is in its flat closing position. In this latter position the upturned flange of the cover plate lies against the depending flange of the supporting member.

The extremities of the edge portions of the cover plates are notched in the planes thereof and bear evenly against the edges of the bearing plates for the channel flanges. Thus, the upturned cover plate flanges enjoy a pivotal connection with the supporting member flanges and are retained in this position until the cover plates are swung to approximately their upright position, from which position they may be unhooked merely by withdrawing the cover plate flange from the dependent flange. In the closing position of the cover plates, their notched edge portions bear for support against the edges of the bearing plates and are prevented from lateral displacement by the cooperating upturned cover plate flanges.

In the drawings:

Fig. 1 is a perspective view of a pair of cover plates, looking along the length of a supporting channel therefor, one of the plates being in place on the rim of a mixing vessel and the other being in an intermediate position thereon;

Fig. 2 is a sectional view taken along the length of the supporting channel and looking edgewise at one of the cover plates;

Fig. 3 is an end edge view of the cover plates and their supporting member on the open top of the vessel;

Fig. 4 is a perspective view similar to Fig. 1 of another form of the invention; and

Fig. 5 is an enlarged exploded perspective view of a portion of the elements for the hinged connection in Figs. 1–4.

The cover plate closure combination **1** is advantageously incorporated on the upper end of a mixing vessel **2** having an annular outwardly extending flange **3** welded to the open top thereof and forming the rim of the vessel. A standard ship channel **6** is supported on the rim of the vessel and extends diametrically thereacross. A mixing or agitating motor mounted on a pedestal **9** is supported by the channel **6**. An agitator shaft **11** suitably coupled to a drive shaft **12** for the motor passes through a suitable gland **13** and through the channel **6** to enter the vessel **2**.

Channel **6** has a pair of spaced flanges **16** and **17** interconnected by and depending from a channel web **18** on which pedestal **9** rests. The lower edge portions of the channel flanges **16** and **17** are elevated above the plane of the vessel's rim **3** by a pair of transverse bearing plates **20** and **21** welded to the extremities of the channel flanges' edge portions, the bearing plates being secured to the flange at the rim of the vessel, and the lower edge portions of the channel flanges **16** and **17** having a clear height above the surface of the rim **3** comparable to the thickness of the bearing plates.

A pair of semi-circular detachable cover plates **24** and **25** are arranged at the sides of channel **6** to overlie the flange of rim **3**. Each cover plate has an upturned flange **28** extending substantially diametrically across the open top of the vessel. The extremities of the edge portion of the cover plate are notched as at **30** so as to be in offset relation to the upturned flange **28** for each cover plate. The lengths of these notched areas **30** of the cover plate are adapted to bear against the edges of the bearing plates **20** and **21**, and the outer extremities of the upturned flange **28** for each cover plate are located at the inner extremities of these notched areas.

Each of the cover plates **24** and **25** preferably have a handle **32** suitably secured to the upper face thereof

to facilitate gripping of the cover plate as it is placed over and removed from the top of the vessel. Each of the cover plates are applied to the vessel by holding the cover plate in a substantially upright position so that the cover plate flange **28** will clear the lower edge portion of each channel flange between bearing plates **20** and **21**, the cover plate flange **28** being hooked under one of the flanges of channel **6**, and the notched cover plate areas **30** resting upon the flange of rim **3**. The cover plate is then lowered about its pivotal connection with the channel to overlie the flange of rim **3**. In this condition, the edges of the notched portions **30** of the cover plate bear on the edges of bearing plates **20** and **21** while flange **28** hooks under one of the depending channel flanges and bears against the inner face thereof.

Thus, the cover plate is supported by the flange **28** bearing against one of the channel flanges while the edges of the notched portions **30** in the cover plate assist in supporting the weight thereof by bearing against the edges of bearing plates **20** and **21**. Lateral displacement of the cover plate is prevented by upturned flange **28** and the edges of notched areas **30** engaging the inner face of a channel flange and the edges of the bearing plates, respectively. It will be noted that the cover plate, by being substantially halved, does not require stiffening members welded across the open end of the vessel. Furthermore, the flange **28** and the notched areas **30** of the cover plate in each instance bear closely against the channel flanges and the bearing plates, respectively, to provide a tight joint. Each cover plate is removed from the rim **3** of the vessel simply by gripping handles **32**, pivotally lifting the plates into a vertical position, and removing their upturned flanges **28** from the underside of channel flanges **16** and **17**, respectively.

In Fig. 4 the features are substantially the same as in Figs. 1–3, except that the cover plates are proportionately larger than the supporting channel and span a substantially greater area at the top of the vessel. In each instance, the channel furnishes substantial direct support for the cover plates and reduces the amount of re-enforcement required for large spans of the cover plates.

I claim:

1. A removable cover plate and supporting member in combination with the open top of a vessel, comprising a supporting member in spanning position over the open vessel and having at least one upright depending flange, a cover plate lying over the open top of the vessel and engageable with the flange of said supporting member, the rim of the vessel underlying the periphery of the cover plate, a surface portion of the cover plate underlying a lower edge portion of said flange, and a second flange extending upwardly from the cover plate and lying within the confines of the supporting member when the cover plate is in a flat position overlying the vessel, said second flange engaging the inner face of the first flange, and edge portions on the cover plate at the opposite extremities of the second flange on which the cover plate rests on the rim of the vessel when the cover plate is raised to its open position.

2. A removable cover plate and supporting member in combination with the open top of a vessel comprising a supporting member in the form of a channel having a pair of spaced depending flanges spanning the open vessel, a cover plate lying over the open top of the vessel, the rim of the vessel underlying the periphery of the cover plate, a surface portion of the cover plate underlying a lower edge portion of one of the channel flanges, a lateral flange upturned from the plane of said cover plate and lying within the confines of the channel when the cover plate is in a flat position overlying the vessel, the cover plate flange engaging the inner face of one of the channel flanges, the cover plate being notched at both ends of the flange providing bearing edge portions on the cover plate on which the cover plate rests on the rim of the vessel when the cover plate is open.

3. A removable cover plate and supporting member in combination with the open top of a vessel comprising a supporting member in the form of a channel having a pair of spaced depending flanges spanning the open vessel, the extremities of the lower edge portions of said depending flanges having bearing portions resting on the rim of the vessel, a cover plate lying over the open top of the vessel, the rim of the vessel underlying the periphery of the cover plate, a surface portion of the cover plate underlying a lower edge portion of one of the channel flanges intermediate the bearing portions thereof, a flange upturned from the surface portion of said cover plate and lying within the confines of the channel intermediate said bearing portions when the cover plate is in a flat position overlying the vessel, the cover plate flange engaging the inner face of one of the channel flanges, the cover plate being notched at both ends of the flange providing bearing edge portions on the cover plate on which the cover plate rests on the rim of the vessel when the cover plate is open, and said bearing edge portions abutting against the outer sides of said bearing portions of the depending flanges when the cover plate is closed.

4. A removable cover plate and supporting member in combination with the open top of a vessel comprising a supporting member in the form of a channel having a pair of spaced depending flanges spanning the open vessel, the extremities of the lower edge portions of said depending flanges having bearing portions resting on the rim of the vessel, said bearing portions elevating the channel flanges above the rim of the vessel, a cover plate lying over the open top of the vessel, the rim of the vessel underlying the periphery of the cover plate, a surface portion of the cover plate underlying a lower edge portion of one of the channel flanges intermediate the bearing portions thereof, a flange upturned from the surface portion of said cover plate and lying within the confines of the channel intermediate said bearing portions when the cover plate is in a flat position overlying the vessel, the cover plate flange engaging the inner face of one of the channel flanges, the cover plate being notched at both ends of the flange providing bearing edge portions on the cover plate on which the cover plate rests on the rim of the vessel when the cover plate is open, and said bearing edge portions abutting against the outer sides of said bearing portions of the depending flanges when the cover plate is closed.

5. A pair of removable cover plates and a supporting channel member in combination with the open top of a vessel comprising a supporting channel member having a pair of spaced depending flanges extending generally downward and spanning the open vessel, the extremities of the lower edge portions of said depending flanges having a pair of bearing plates secured thereto and supported on the rim of the vessel, the lower edge portions of the channel flanges being elevated above the rim of the vessel a distance comparable to the thickness of said cover plates, a pair of cover plates lying over the top end of the vessel at the sides of the channel flanges, the rim of the vessel underlying the periphery of each cover plate, a surface portion of each cover plate underlying the lower edge portions of the channel flanges intermediate said bearing plates, a flange extending at approximately right angles from the surface portion of each of said cover plates and lying within the channel member when the cover plate is in a flat position overlying the vessel, each cover plate flange engaging the inner face of a channel flange, each cover plate being notched at both ends of the flange providing bearing edge portions on each cover plate on which each cover plate rests on the rim of the vessel when each cover plate is open, and said bearing edge portions abutting against the outer sides of said bearing portions of the depending flanges when each cover plate is closed.

6. A removable cover plate and supporting member in combination with the open top of a vessel comprising a

supporting member in spanning position over the open vessel and having at least one depending flange, a separate cover plate lying over the open top of the vessel and having a flat portion to be supported on and to cover at least a part of the open top of the vessel, said flat cover plate having an upturned flange at one side thereof, the opposite ends of the flange being spaced from the adjacent ends of the side of the cover plate from which the flange extends, the upturned flange being hooked under the depending flange of the supporting member and thereby securing the cover plate in position on top of the vessel, the edge portions of the cover plate outwardly from the

ends of the flange being in alignment, said edge portions, when the cover plate is raised to open position, resting on the top of the vessel and forming a fulcrum line about which the cover plate pivots.

References Cited in the file of this patent

UNITED STATES PATENTS

228,452	Elwell	June 8, 1880
2,318,122	Williams	May 4, 1933
2,557,812	Budlong	June 19, 1951
2,599,362	Belsky	June 3, 1952