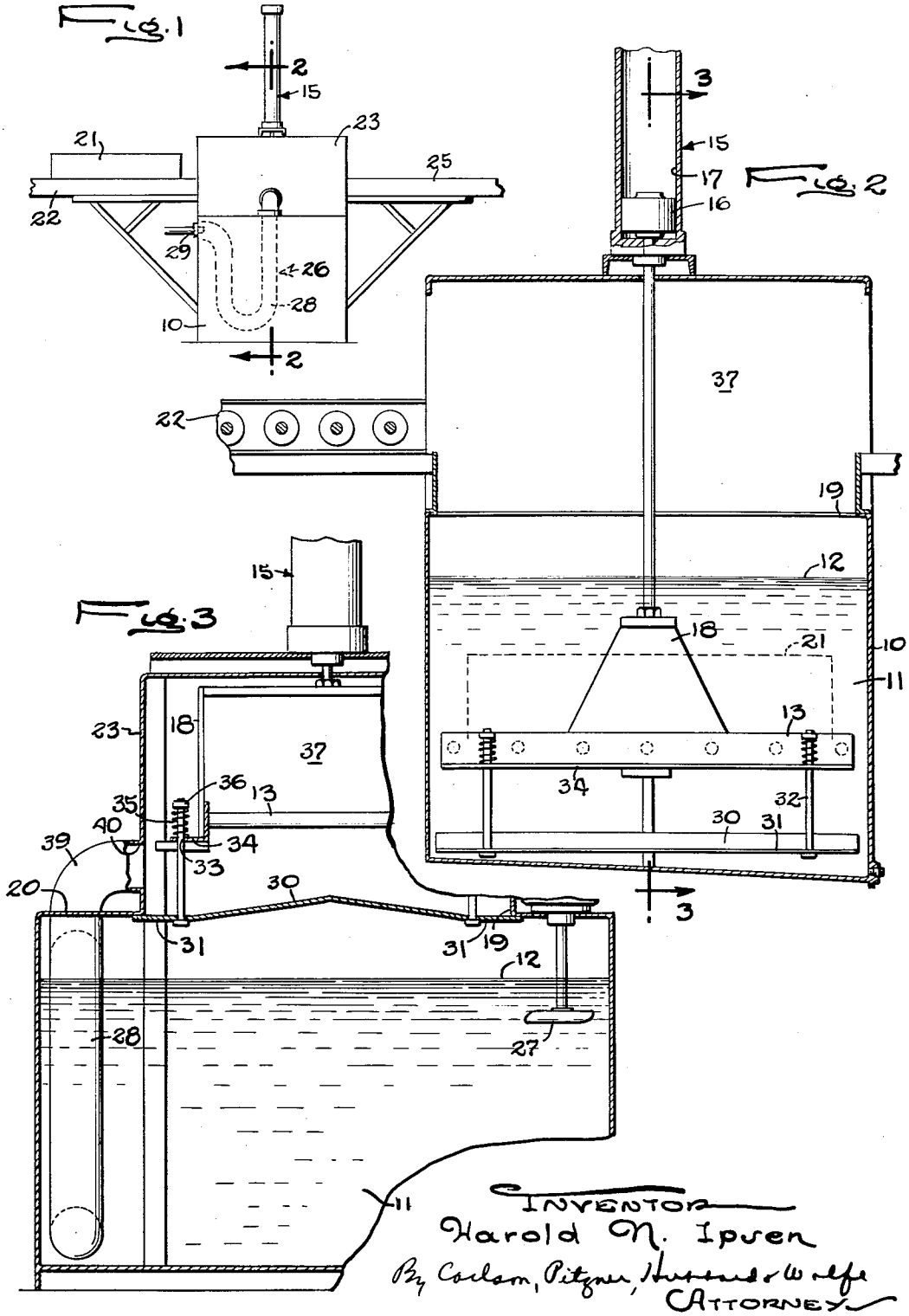
May 29, 1956 H. N. IPSEN 2,747,590

WASHER FOR WORKPIECES

Filed Oct. 4, 1951



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United States Patent Office 2,747,590 Patented May 29, 1956

2,747,590

WASHER FOR WORKPIECES

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Application October 4, 1951, Serial No. 249,768

4 Claims. (Cl. 134—105)

This invention relates to a washer of the type in which workpieces are washed in a heated bath. More particularly, this invention relates to a washer in which the workpieces are supported on an elevator platform which is lowered through an opening in the tank containing the washing liquid.

The general object is to provide a new and improved washer of the above character in which a cover automatically opens and closes the receptacle opening as the platform is lowered and raised into and out of the receptacle thereby reducing the loss of heat from the washing liquid and facilitating drying of the washed workpieces.

A more detailed object is to mount the tank cover on the elevator platform so as to utilize the movement of the latter to shift the cover between open and closed positions.

Another object is to heat the washing liquid by gases which are exhausted through washed workpieces and thus utilized to dry the latter.

The invention also resides in the novel construction of the cover to permit the washing liquid to drain from the workpieces back into the receptacle.

Other objects and advantages of the invention will become apparent from the following detailed description taken in connection with the accompanying drawings, in which

Figure 1 is an elevational view showing a washer embodying the novel features of this invention.

Fig. 2 is an enlarged fragmentary sectional view taken along the line 2—2 of Fig. 1.

Fig. 3 is a fragmentary sectional view taken along the line 3—3 of Fig. 2.

For the purposes of illustration, the invention is shown in the drawings as embodied in a washer which includes a receptacle or tank 10 defining a washing chamber 11 and containing a body of liquid 12 in which the workpieces are to be washed. To immerse the workpieces in the liquid, they are supported on an elevator platform 13 which is connected to a motor 15, shown as a piston 16 and a cylinder 17, through an inverted yoke framework 18 and lowered into the tank through a rectangular opening 19 formed in a horizontal upper tank wall 20. Herein the workpieces are loaded in a tray 21 and transferred from a loading platform or support 22 at one side of the washer to the work supporting platform 13 within a casing 23, which encloses the opening 19, while another support 25 located on the opposite side of the casing receives the tray after the workpieces have been washed, the supports being conveniently mounted at the level at which the platform 13 stops when raised by the elevator.

To maintain the bath 12 at the desired temperature, the liquid is in heat exchanging relation with a heater 26 and is circulated by an agitator 27. Herein the heater comprises a tube 28 projecting into the washing chamber 11 to heat the liquid and forming a conduit for hot gases which are heated, for example, by a burner 29 disposed at the inlet end of the tube.

The present invention contemplates automatically covering and uncovering the opening 19 as the work supporting platform 13 is raised and lowered out of and into the washing chamber 11. For this purpose, a rectanguluar imperforate cover plate 30 is suspended from the framework 18 in the chamber to close the opening and to separate the chamber from the interior of the casing 23 when the platform is in its elevated position. The cover 30 is spaced below the platform a distance such that when the platform is in its uppermost position alined with the supports 22 and 25 horizontally extending flanges 31 formed at the edges of the cover will engage the inside of the upper wall 20 about the opening and close the latter. While the cover plate substantially closes the opening, it is desirable that the engagement between the plate and the upper wall be sufficiently loose to permit the liquid which adheres to the workpieces to drain back into the tank 10. To facilitate this draining, the upper surface of the cover is inclined downwardly from the center thereof, as shown in Fig. 3, whereby any liquid remaining on the cover after the platform 13 is raised flows toward the edges of the cover where it drains into the washing chamber 11. As illustrated, the inclined surface is formed by bending the central portion of the cover plate upwardly from the flanges 31 and the dimension of the cover longitudinally of the bent portion is slightly less than the respective dimension of the opening 19 so that the central portion of the cover may project through the opening when the flanges engage the upper wall 20.

To insure that both flanges 31 engage the upper wall 20, the cover 30 is suspended from the framework 18 by a plurality of bolts 32 each of which projects through the cover and extends upwardly through an aperture 33 in a flange 34 on the framework. The bolts and the cover are yieldably supported by springs 35 which act between a nut 36 on the end of each bolt and the flange 34. With this construction, should one edge of the cover engage the upper wall 20 before the other edge as the cover and the platform 13 are raised by the elevator 15, the springs associated with the bolts adjacent the contacting edge will be compressed permitting the other edge to be raised into engagement with the upper wall. Preferably, the nuts 36 are adjusted on the bolts so that when the platform 13 is alined with the supports 22 and 25 all the springs 35 will be slightly compressed to hold the cover in position with the flanges 31 bearing against the upper wall which thereby performs the function of a stop for the cover limiting its upward movement.

The present invention also contemplates utilizing the exhaust gases of the heater 26 to dry the workpieces after they have been returned to the interior of the casing 23, which thus defines a drying chamber 37. For this purpose, the exhaust end 39 of the tube 28 terminates in an outlet 40 opening into the drying chamber 37 at a point above the cover 30 and below the platform 13 when they are in the raised position. Since the gases are warm as they enter the drying chamber, they will circulate around the work supporting platform 13 and assist in drying the workpieces. Since the cover 30 is heated by the hot vapors within the washing chamber 11, the cover radiates additional heat for the drying operation.

In operation, a tray 21 of workpieces which has been transferred to the platform 13 from the loading support 22 is lowered through the opening 19 into the washing chamber 11 by the elevator 15. At the same time that the platform is lowered down through the opening, the cover 30 is lowered away from the upper wall 20 thus automatically uncovering the opening. After the workpieces have been washed by the liquid 12, the platform is raised into alinement with the supports 22 and 25 and

the cover closes the opening **19** and is held in engagement with the upper wall **20** by the springs **35**. With the opening covered, vapors in the washing chamber **11** are substantially excluded from the drying chamber **37** permitting the drying operation to take place in a comparatively dry atmosphere and preventing the wasteful loss of heat from the washing chamber. Because of the inclined upper surface of the cover, any liquid which adhered to the workpieces flows toward the edges of the cover and drains back into the tank thus preventing any liquid from collecting on the cover and permitting heat to radiate from the cover more efficiently. With the tray **21** resting in the drying chamber, the exhaust gases from the heater **26** circulate about the workpieces and quickly dry them after which the tray is transferred to the unloading support **25**.

It will be apparent that, since the cover **30** opens and closes the opening **19** automatically as the platform **13** is lowered and raised, the tank **10** is open only during the time necessary to wash the workpieces. Therefore, the loss of heat from the washing chamber **11**, is minimized and moist vapors, which would deter the drying operation, are excluded from the drying chamber **37**. In addition, by inclining the upper surface of the cover and by exhausting the gases from the heater **26** into the drying chamber the time necessary to dry the workpieces is appreciably shortened.

I claim as my invention:

1. A washer comprising, in combination, a walled receptacle defining a washing chamber adapted to hold a body of liquid and having an opening in a horizontal upper wall thereof, a casing enclosing said opening and defining a drying chamber communicating with said washing chamber through the opening, an elevator having a work supporting platform movable vertically through said opening between an upper position in said drying chamber and a lower position in said washing chamber, a cover for said opening, means operable as an incident to the raising and lowering of said platform to move said cover to open and close the opening, and a conduit in heat exchanging relation with said liquid and adapted to conduct heated gases therethrough, said conduit having an outlet opening into said drying chamber above said cover and below said platform whereby to permit the heated gases to circulate about said platform and to dry the work supported thereby.

2. A washer comprising, in combination, a walled receptacle defining a washing chamber adapted to hold a body of liquid and having an opening in a horizontal upper wall thereof, a casing enclosing said opening and defining a drying chamber communicating with said washing chamber through the opening, an elevator having a work supporting platform movable vertically through said

opening between an upper position in said drying chamber and a lower position in said washing chamber, a cover for said opening, means operable as an incident to the raising and lowering of said platform to move said cover to open and close the opening, and a conduit in heat exchanging relation with said liquid and adapted to conduct heated gases therethrough, said conduit having an outlet opening into said drying chamber whereby to permit the heated gases to circulate about said platform and to dry the work supported thereby.

3. A washer comprising, in combination, a walled receptacle defining a washing chamber adapted to hold a body of liquid and having an opening in a horizontal upper wall thereof, a cover plate disposed in said chambe to engage said upper wall about said opening to close the latter, a framework extending into said chamber through said opening, means suspended from said framework and yieldably supporting said plate, an elevator connected to said framework to lower said plate away from said opening and to return said plate into closing engagement with said upper wall, and a work supporting platform mounted on said framework above said plate to be lowered through said opening into said chamber during movement of said plate away from the opening.

4. A washer comprising, in combination, a walled receptacle defining a washing chamber adapted to hold a body of liquid and having an opening in a horizontal upper wall thereof, a casing enclosing said opening and defining a drying chamber communicating with said washing chamber through the opening, an elevator having a work supporting platform movable vertically through said opening between an upper position in said drying chamber and a lower position in said washing chamber, a cover for said opening, means operable as an incident to the raising and lowering of said platform to move said cover to open and close the opening, and a conduit adapted to conduct heated gases therethrough and having a first portion in heat exchanging relation with said liquid, said conduit having a second portion beyond said first portion extending to said drying chamber to heat the latter and thereby assist the drying of the work supported by said platform.

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