

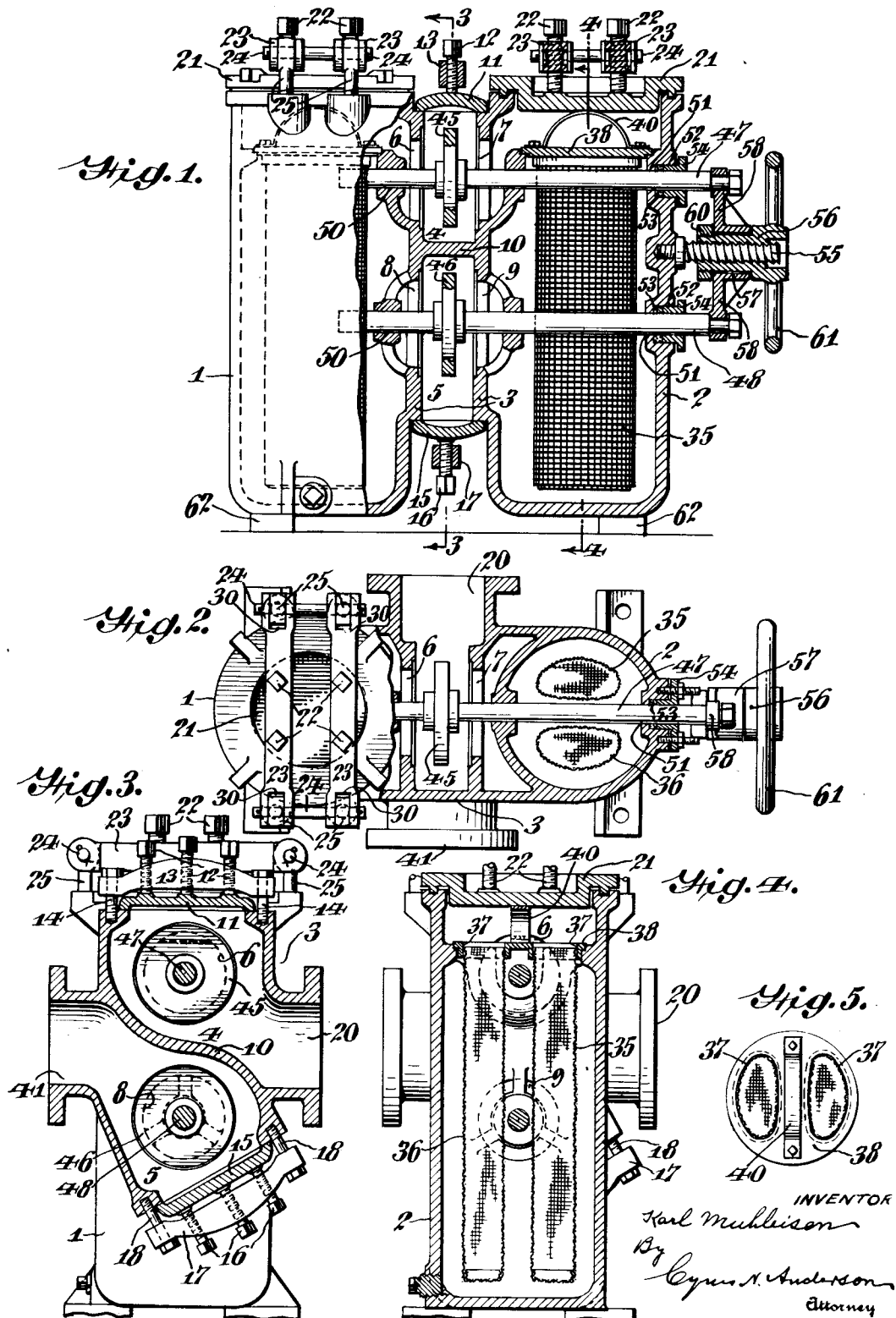
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DUPLEX STRAINER

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DUPLEX STRAINER

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My invention relates to strainers for use in the straining of liquids for the purpose of removing therefrom matter or material in the form of lumps or particles of foreign matter which it may be desired to remove. The strainer is of duplex valve type and is suitable for use in the straining of oils, water and other liquids to clean the same.

The general object of the invention is to provide a strainer of duplex type of novel construction wherein the casings of the respective strainers are so related and connected to each other as to facilitate the producing thereof as a single integral casting.

It also is an object of the invention to provide an improvement in the means for enabling or permitting access to the interiors of the casings of the respective strainers of the couple for the purpose of cleaning the same.

A still further object of the invention is to provide an improvement in the means for adjusting the valves of the two strainers simultaneously in either of two directions for the purpose of controlling the flow of a liquid through the strainer.

To the foregoing and other ends the invention comprehends the construction and arrangement as hereinafter described in detail, particularly pointed out in the claims and as illustrated in the drawing wherein I have shown one mechanical embodiment of the invention in a form which at present is preferred by me. However, it should be understood that the invention may be embodied in constructions other than that disclosed and that changes in the details of construction may be made within the scope of the claims without departing from the invention or the principle thereof.

In the drawing:

Fig. 1 is a view partly in elevation and partly in vertical sectional elevation;

Fig. 2 is a view partly in top plan and partly in transverse section;

Fig. 3 is a vertical sectional view taken on the line 3—3 of Fig. 1;

Fig. 4 is a vertical sectional view taken on the line 4—4 of Fig. 1; and

Fig. 5 is a top plan view of a strainer em-

ployed within the casings of the strainer structure.

In the drawing I have shown a frame structure comprising casings 1 and 2 which are located in adjoining relation to each other as shown and which are rigidly connected to each other by the intermediate connecting means indicated as a whole by the numeral 3. The connecting means is provided with upper and lower chambers 4 and 5. Openings or passageways 6 and 7 lead from the opposite sides of the chamber 4 into the upper ends of the chambers provided by the casings 1 and 2. Openings or passageways 8 and 9 lead from the casings 1 and 2 into the lower chamber 5 previously referred to. These chambers are separated from each other by the upwardly and cross-wise extending partition wall 10. The upper end of the chamber 4 is closed by means of a stationary plate 11 which is adapted to be held and fastened in closed position by means of adjustable binding screws 12 of which there are in the construction shown three. These adjustable binding screws are mounted in a cross bar 13 which is located above the upper open end of the chamber 4 and retained in place by means of headed bolts 14 which are secured in opposed relation to each other in the upper edge of the wall of the said chamber 4. The plate 11 may be removed by removing the headed bolts 14 to permit the removal of the cross bar 13.

The lower open end of the chamber 5 is closed by a similar cover plate 15 which is held in closed position by means of adjustable binding screws 16 which are in adjustable engagement with the cross bar 17 which extends below and in lengthwise relation to the cover plate 15 and is mounted at its opposite ends upon headed bolts 18 which are removably secured to the lower edges of the walls of the chamber 5. The top open ends of the chambers of the casings 1 and 2 are respectively closed by means of cover heads or plates 21 which are removably retained in place in closed position by means of adjustable binding and holding screws 22 which are adjustably mounted in the bars 23 which are supported at their opposite ends upon pins or rods 24 which extend through open-

ings provided in upright posts 25 which are secured at their lower ends to the top portions of the casings 1 and 2. There are two of these cross bars associated with the top end of each of the casings 1 and 2. Each cross bar is provided at its opposite ends with slots or openings 30 within which portions of the supporting posts 25 are located. Horizontal openings are provided through the opposite ends of the bars 23 and through the posts 25 as indicated in the drawing. The pins 24 extend through these openings and secure the bars to the supports 25. By removal of the pins 24 the bars 23 may be removed to thereby permit the removal of the cover heads or plates 21.

Strainers are located in the chambers of each of the casings 1 and 2. These strainers are of identical construction, though such identity is not of the essence of the invention. Each of the strainers comprises two liquid straining elements or parts, 35 and 36. The strainers of each of the strainer structures are of oblong shape as best shown in Fig. 2 of the drawing. The lower ends of the respective strainers 35 and 36 of each strainer structure are closed while the upper ends thereof are open and are secured within openings 37 provided in the respective plates 38 which are supported within the chambers of the casings 1 and 2 near the upper ends thereof. The openings through the respective plates 38 are spaced from each other as shown so that the strainers 35 and 36 of the respective strainer structures are spaced from each other. This relationship is best shown in Fig. 2 of the drawing. For the purpose of readily removing the strainer structures from the chambers of the casings when the cover heads or plates 21 are removed, I have provided the plates 38 with handles 40 which project upwardly therefrom. These handles preferably are of a height such that when the cover plates or heads 21 are in place the lower sides thereof contact with the upper sides of the handles and operate to hold the plates 38 and the strainers supported thereby in position as shown in Figs. 1 and 4 of the drawing.

The liquid to be treated is supplied from any source of supply through the inlet port 20 to the chamber 4. From the latter it flows outwardly through the outlet openings 6 and 7 into the upper portions of the chambers of the casings 1 and 2. From the upper portions of the said casings the liquid flows into the upper open ends of the strainers 35 and 36 and through the meshes thereof into the chambers of the casings 1 and 2 below the plates 38. The liquid thus entering the portions of the chambers of the casings 1 and 2 below the plates 38 flows from the said chambers out through the openings 8 and 9 into the chamber 5 and thence through an outlet port 41. From the outlet port 41 the liquid is conveyed through a tube or conduit,

not shown, to its selected destination. For the purpose of controlling the flow of liquid from the chamber 4 into the upper portions of the chambers of the casings 1 and 2 and the out-flow of the liquid from the lower portions of the said chambers through the openings 8 and 9 into the chamber 5, I have provided valves 45 and 46 located respectively in the chambers 4 and 5. As illustrated, these valves are shown in positions midway of the opposite sides of the chambers 4 and 5 with both of the openings 6 and 7 and 8 and 9 open. The valves 45 and 46 are supported upon rods or bars 47 and 48 which are mounted at their inner ends in bearings 50 provided in indented portions of the inner walls of the casings 1 and 2. The bearings of both pairs of bearings are located relatively close together so that there is little likelihood of deflection of the portions of the rods or bars 47 and 48 between the said bearings. By this means the valves 45 and 46 are held rigidly in position and are not permitted to vibrate or tilt. The outer end portions of the said rods or bars are mounted in bearings 51 consisting of openings provided in the oppositely disposed portions of the outer wall of the casing 2. To prevent leakage of liquid through the openings or bearings 51 I have provided recesses 52 in the outer sides of the wall of the casing 2 in alignment with the bearing openings 51 within which is located packing material 53 held in place by glands 54 in known manner. The valves 45 and 46 may be adjusted simultaneously in either of two directions, toward the left or toward the right, to close the openings 6 and 8 or 7 and 9. For the purpose of simultaneously adjusting the rods or bars 47 and 48 lengthwise to effect or cause simultaneous corresponding movements of the valves 45 and 46, I have provided a threaded stud or bolt 55 with which a sleeve 56 is in screw-threaded engagement. The said sleeve is rotatably supported in an opening or bearing 57 which extends through a cross bar or cross head 58 which is connected at its opposite ends to the outer ends of the rods or bars 47 and 48. The connection between the cross bar 58 and the sleeve 56 is loose so that there may be a limited amount of play between the two, and likewise the connections between the opposite ends of the cross bar 58 and the outer ends of the rods or bars 47 and 48 are loose so that there may be a limited amount of play between the said cross bar and the said rods or bars 47 and 48. It will be noticed that the width between the shoulders at the outer ends of the rods or bars 47 and 48 and the inner sides of the nuts secured to the extreme outer ends of the said rods or bars is slightly wider than the thickness of the ends of the cross bar 58. The purpose of making these connections so

that there may be a limited amount of play is to insure that the valves 45 and 46 shall always contact with their respective seats even though the planes of the upper and lower seats should be slightly displaced with reference to each other. Assume for the moment that the valves 45 and 46 have been adjusted toward the left to close the openings 6 and 8 and that the plane of the seat for the valves 48 with which it contacts to close the opening 6 is slightly nearer to the medial plane of the chambers 4 and 5 than is the corresponding seat for the valve 46. It would follow that the valve 45 would first be seated leaving the valve 46 spaced slightly from its seat. If, however, the connections between the cross bar 58 and the sleeve 56 and between the opposite ends of the cross bar 58 and the outer ends of the rods or bars 47 and 48 are loose as above described, it will be apparent that upon the continued operation of the sleeve 56 the cross bar 58 will be slightly tilted in order to cause additional adjustment of the rod or bar 48 to effect complete closure of the valve 46. The same operation would take place with respect to the valve 45 under similar conditions. It will be seen, therefore, that I have provided means whereby both valves 45 and 46 may be positively and fully closed notwithstanding slight displacements of the vertical planes of the respective valve seats with relation to each other. A nut 60 is secured to the inner end of the sleeve 56 to retain the latter in the opening or bearing 57. For the purpose of rotating the sleeve 56 I have provided a handwheel 61. The sleeve 56 is so mounted as to permit rotation thereof but it is prevented from lengthwise or axial movement relatively to the cross bar 58 and to the rods or bars 47 and 48. Upon rotation of the said sleeve 56 it is moved in one direction or the other lengthwise of the screw-threaded post 55, depending upon the direction of rotation, to thereby cause lengthwise movement of the rods or bars 47 and 48. The movement of these bars operates to adjust the valves 45 and 46 within the chambers 4 and 5 to control the passage of liquid through the said chambers. It will be apparent that adjustment of the valves 45 and 46 may be effected readily and quickly and that both valves are simultaneously thrown into positions to close the openings as above described or into positions in which the said openings are open.

The position of the sleeve 56 with reference to the threaded bolt 55 will indicate the positions of the valves 45 and 46 in the chambers 4 and 5; hence it will be seen that I have provided convenient means for indicating to anyone in charge of the strainer the positions of the valves 45 and 46 with respect to

the openings which they are intended to control.

In view of the fact that both valves are caused to move simultaneously by the actuation of a single instrumentality it will be apparent that no one in charge may inadvertently close one valve and leave the other open. In other words the construction and operation of the device are of a character such that mistakes cannot be made in the opening and the closing of one valve with respect to the other.

In case it should become necessary to have access to one or the other of the chambers of casings 1 and 2 for the purpose of cleaning or repairing the same, the valves 45 may move into positions to close the openings between the chambers 4 and 5 and the chamber of the casing which it is desired to clean or in which it is desired to make repairs. In such case the other side of the strainer structure may continue to operate. It is very convenient and of great advantage to be able to operate simultaneously both valves either into a closed position or into an open position. The means employed by me for that purpose is characterized by its simplicity and by the facility with which it may be operated.

Either of the cover plates 11 or 15 may be readily removed to permit access to the chambers 4 or 5. It will be noted that the lower open end of the chamber 5 is located in a plane which extends upwardly at an angle to a vertical line and also that the said lower end is located a distance from the lower end of the structure as a whole. By this means access may be had to the interior of the chamber 5 upon removal of the cover plate 15. It is very desirable that access may be had not only to the upper chamber 4 but also to the lower chamber without the necessity of disturbing any portion of the structure other than the removal of the cover plates 11 and 15.

The lower ends of the casings 1 and 2 may be provided with projections 62 by which the strainer structure may be supported upon any suitable support.

As already indicated I have provided a casing of a structure such that it may be produced in a single integral casting thereby not only being enabled to produce the casing economically but also being enabled to produce a casing which is rigid and rugged.

Having thus described my invention what I claim and desire to secure by Letters Patent is:

1. A duplex strainer for straining liquids comprising a couple of casings, means located between and connected to the said casings for holding the same in fixed relation to each other, the said means being provided with liquid inlet and outlet chambers one of which is located in adjoining relation to the upper ends of the said casings and the

other of which is located in adjoining relation to the lower ends of said casings, the upper end of the former and the lower end of the latter being open, removable cover plates for closing the open ends of the said chambers, the lower end of the lower chamber being located in a plane extending upwardly and at an angle to a vertical line to facilitate access to the said chamber upon removal of the cover plate therefrom, and valves for controlling the flow of liquid through the said chambers.

2. A duplex strainer for straining liquids comprising a couple of casings, means located between and connected to the said casings for holding the same in fixed relation to each other, the said means being provided with liquid inlet and outlet chambers one of which is located in adjoining relation to the upper ends of the said casings and the other of which is located in adjoining relation to the lower ends of said casings, the upper end of the former and the lower end of the latter being open, removable cover plates for closing the open ends of the said chambers, the lower end of the lower chamber being located in a plane extending upwardly and at an angle to a vertical line to facilitate access to the said chamber upon removal of the cover plate therefrom, spaced rods which are longitudinally movable the inner end portions of said rods extending through the said chambers and the outer end portions thereof projecting through one of the said casings and terminating outside of the latter, valves mounted in the said chambers for controlling the flow of liquid through the latter, and means having connection with the outer ends of the said rods for effecting simultaneous longitudinal adjustment thereof to cause corresponding adjustments of the said valves to control the flow of liquid through the said chambers.

3. A duplex strainer for straining liquids

comprising casings, means for connecting the said casings together, the said casings and means being embodied in a single integral casting, the said means being provided with liquid inlet and outlet chambers the walls of which are provided with openings placing the said chambers in communication with the interiors of the said casings, one of the said chambers being located in adjoining relation to the upper ends of the said casing while the other thereof is located in adjoining relation to the lower ends of said casings, the top and bottom of the respective chambers being open, the open top of the upper chamber being located in a horizontal plane while the open top of the lower chamber is located in an inclined plane which extends at an angle to a vertical line, removable cover plates for closing the open top and bottom ends of the respective chambers, and valves for controlling the flow of liquid through the said chambers into and from the interiors of the said casings.

4. A duplex strainer comprising a couple of casings having chambers therein, means for connecting and holding the said casings in rigid relation to each other, the said means being provided with inlet and outlet chambers, valves associated with said chambers, longitudinally movable bars for supporting the said valves and means for actuating said bars for causing longitudinal movements thereof to adjust the said valves with respect to the said chambers to control the flow of liquid therethrough, the said single means comprising a stud having screw threads thereon and connected to said casing, a sleeve having screw threaded engagement with said stud, and a cross bar loosely connected to said sleeve and to said bars to permit a limited amount of play between said bars and said cross bar and between said cross bar and said sleeve.

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