May 20, 1941. T. H. BIRCH 2,242,901

STRAINER CLEANING DEVICE

Filed March 16, 1940 2 Sheets-Sheet 1

Fig. 1.

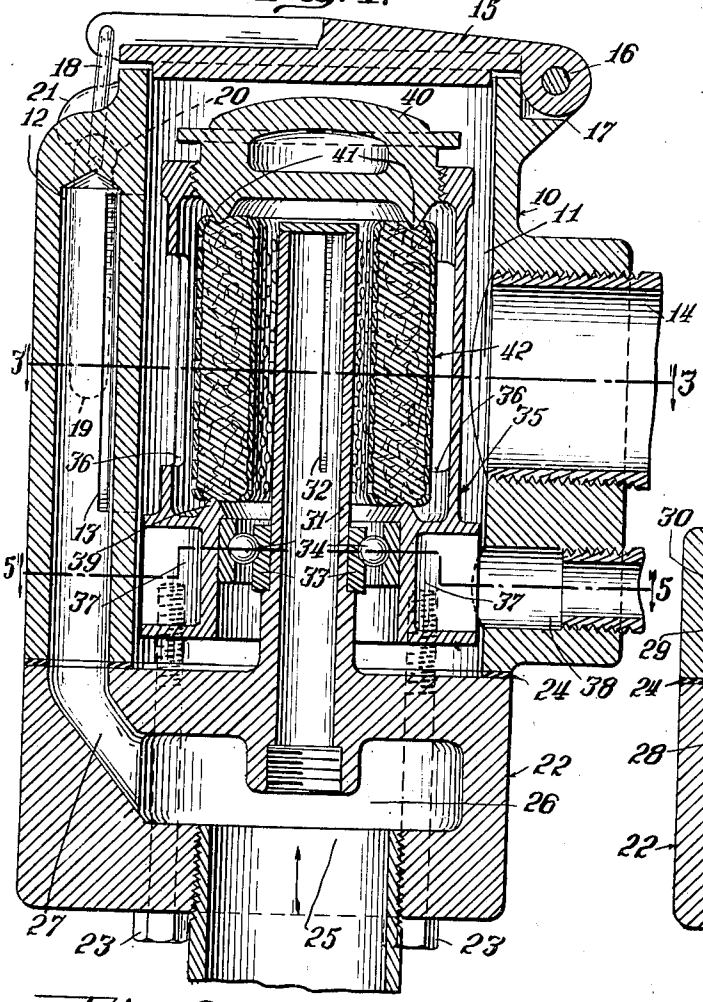


Fig 4.

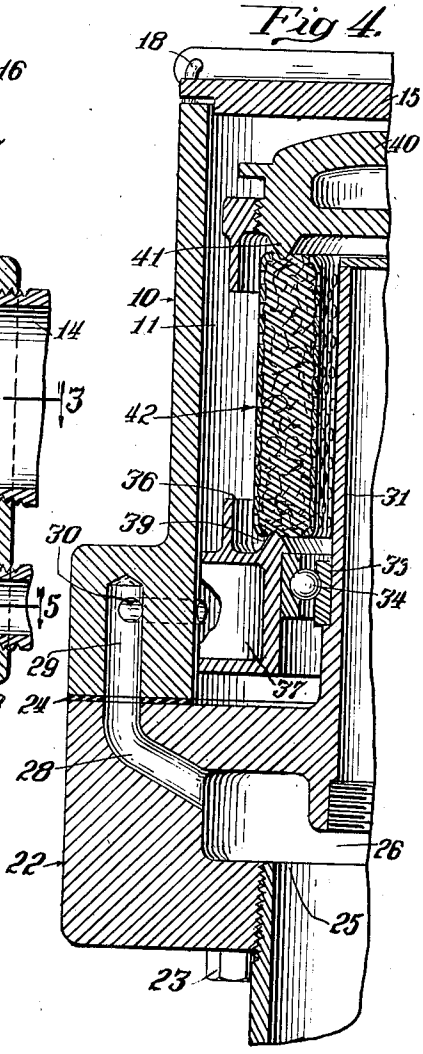
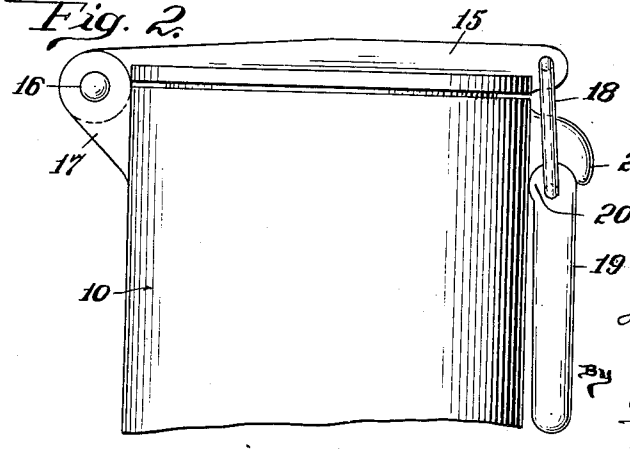


Fig. 2.



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May 20, 1941. T. H. BIRCH 2,242,901

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Filed March 16, 1940 2 Sheets-Sheet 2

Fig. 3.

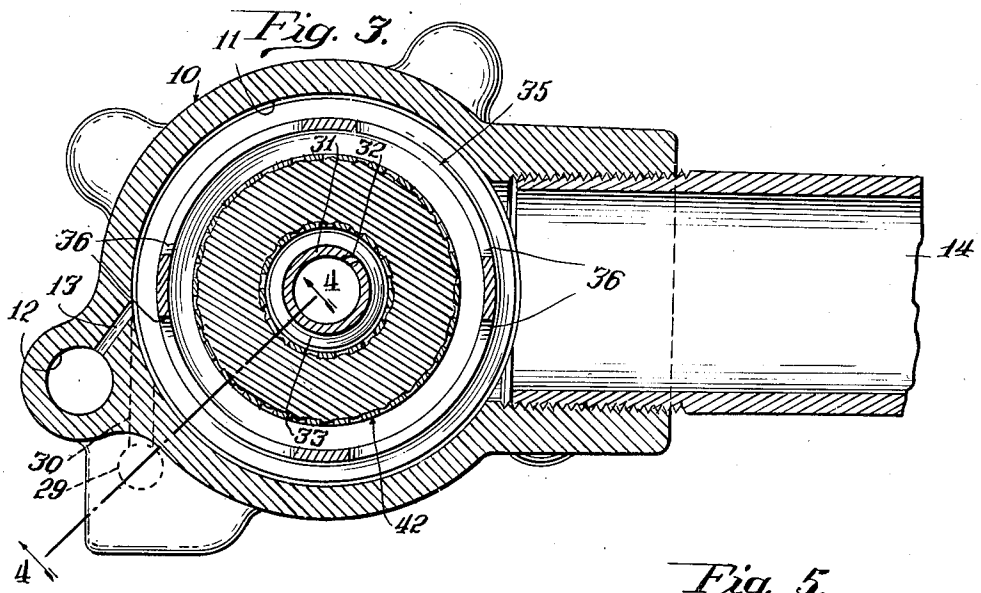


Fig. 6.

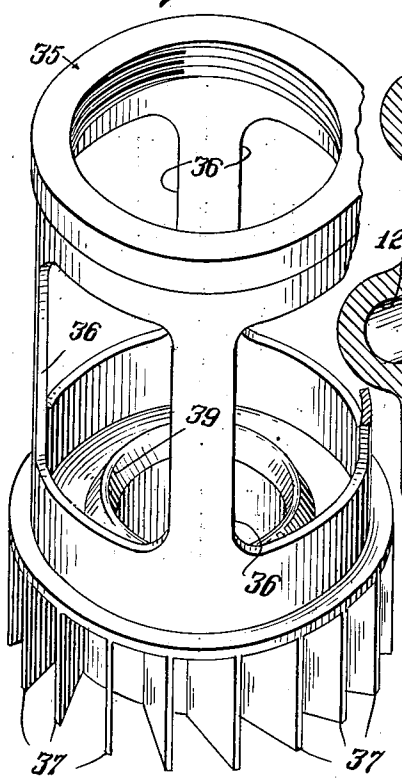
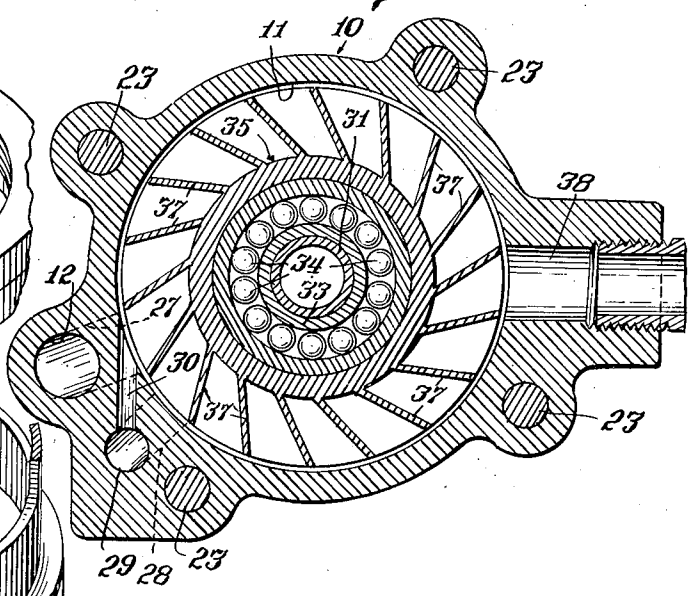


Fig. 5.



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UNITED STATES PATENT OFFICE

2,242,901

STRAINER CLEANING DEVICE

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Application March 16, 1940, Serial No. 324,303

8 Claims. (Cl. 15—20)

My invention relates to a device for cleaning the strainers of AB brake valves employed in conjunction with the air lines and brake equipment of railroad cars; the invention having for an object the provision of a compact portable device capable of use at the car in connection with the air line of the train.

The invention also has for its object the provision of a structure involving means whereby the strainer is positively driven or rotated by the injected cleaning medium or fluid thereby presenting the entire strainer to the forcible jets of cleaning medium flowing into the device and ensuring a more uniform and thorough cleaning of the strainer.

The invention further contemplates a construction whereby certain portions or jets of the cleaning medium, during the strainer cleaning operation, will cause the dirt radially forced from the strainer to be ejected from the cylinder or casing of the device; the invention presenting a device of comparatively simple construction having a single medium inlet opening and a single discharge outlet opening.

The foregoing enumerated objects and other objects and advantages of the invention will be readily comprehended from the detailed description of the device as illustrated in the accompanying drawings wherein:

Figure 1 is a vertical sectional view of my improved device with a strainer positioned therein and also shown in section.

Figure 2 illustrates the upper or hinged cover end of the device showing the cover locking means.

Figure 3 is a cross-section taken on the line 3—3 of Figure 1 as viewed by the arrows.

Figure 4 is a vertical sectional view taken on the line 4—4 of Figure 3, looking in the direction of the arrows.

Figure 5 is a cross sectional view taken on the off-set line 5—5 of Figure 1 looking in the direction of the arrows.

Figure 6 is a perspective view of the strainer holding cage and rotor, with a portion broken away.

The exemplification of the invention comprises a shell or casing 10 with a cylindrical interior or chamber 11; the wall of the casing at one side being enlarged and provided with a passage 12 leading upwardly from the lower end of the casing and communicating with the cylindrical chamber 11 through the elongated port or slot 13 arranged tangentially to the diameter of the chamber 11, as shown in Figure 3. The chamber 11 at the side opposite to the port 13 is provided with a discharge opening or outlet 14 through which the dirt laden air or cleaning medium is discharged from the chamber.

The upper end of the casing 10 is provided with a closure member or cover 15 pivotally mounted at 16 between a pair of lobes or ears 17 secured to the casing, while the free or opposite side of the cover is provided with a link 18 which pendently supports a lever 19, whose upper or connected end preferably is of arcuate formation and slightly enlarged at one side as shown at 20 in Figure 2.

The side of the casing 10 is provided with a downwardly curving or hook-like lug 21 and the link 18, which straddles the lug 21, is sufficiently long to clear the downwardly disposed tip of the hook-like lug 21 and permit the arcuate head or upper end of lever 19 to snugly enter the socket of the lug 21, so that when lever 19 is swung downwardly as shown in Figure 2, it will cause the cover 15, through the medium of link 18, to be drawn down into tight relation with the top of the casing 10; the cover on top of the casing being preferably provided with a suitable gasket to ensure a substantially air-tight seal. Swinging lever 19 upwardly will cause it to tilt at the fulcrum providing enlargement 20 and enable the cover-holding means to be easily brought into unlocking position.

The lower end of the casing 10 preferably has a separate bottom 22 secured in place by suitable screw-bolts as at 23 and a fluid or air-tight relation between the casing and bottom being preferably obtained by use of a suitable gasket as shown at 24.

The bottom 22 is cored to provide a fluid or compressed air inlet 25 which terminates in a chamber 26 from which a pair of upwardly disposed passages 27 and 28 extend, see Figures 1 and 4. The passage 27 communicates with the passage 12 in one side of the casing and passage 28 communicates with a passage 29 formed in an enlarged portion at the lower end of the casing as shown in Figure 4; the passage 29 being provided with a port 30 which enters the lower end of the main chamber in a tangential manner.

The bottom 22 is provided with an upwardly disposed hollow stem or spindle 31 closed at its upper end as shown in Figures 1 and 4, while the lower end communicates with the chamber 26; the stem or spindle 31 being centrally disposed in the casing chamber 11 and in one side is provided with a longitudinally disposed slot 32,

which preferably is cut at an angle to the diameter of the spindle as shown in Figure 3.

The spindle 31, adjacent the bottom, is enlarged to provide a shoulder for supporting the race-way 33 of the ball-bearing 34 whereby the combined strainer holding cage and rotor member 35 is revolvably supported in the chamber 11.

The member 35 at its upper end is in the nature of a skeleton or spider cage with large openings 36 as shown in Figure 6; while the base of the member 35 is enlarged and provided with a plurality of tangentially arranged vanes 37, see Figures 5 and 6, to constitute a rotor or turbine adapted to revolve about the spindle 31.

The lower or rotor end of the chamber 11 is shown provided with an opening 33 extending to the casing exterior.

The top of the base of member 35 is provided with an annular upwardly tapering rib 39 disposed about the central opening in the base and through which the stationary spindle 31 extends.

The upper end of the cage portion of member 35 is provided with a cap 40 which screws into the open end of the cage and on its lower face is provided with an annular tapering rib 41, substantially matching the annular rib 39 on the base portion of the cage 35.

The tapering ribs 39 and 41 are intended to properly hold the strainer, generally shown at 42, in the cage portion of member 35 as shown in Figures 1 and 4 and induce the strainer to revolve with the cage about the spindle 31 and consequently rotating the entire inner foraminated wall of the strainer through the stream of pressure medium issuing through port 32.

The AB brake valve strainers at present in use are in cartridge or cylindrical form consisting of concentrically arranged wire mesh inner and outer tubular members spaced apart with curled hair therebetween and the ends of the hair holding annular chamber closed by suitable felt rings which causes the air to pass through the foraminated cylindrical walls and the intermediate curled hair. As the strainer is a well known construction, further detailed description is not deemed necessary.

The annular ribs 39 and 41, in the upper and lower parts of the cage, engage the felt or closure rings at opposite ends of the strainer as shown in Figures 1 and 4; a firm holding of the strainer being effected by screwing the cap member 40 downwardly in the upper threaded end of the cage, thus causing the strainer to rotate with the cage. With the annular ribs 39 and 41 effecting firm engagement with the felt washers at both ends of the strainer, a complete closure for the central or core portion of the strainer is provided so that all air or other medium discharged through slot 32 during cleaning operation is made to pass radially through the strainer and hence through the straining medium or hair.

The strainers of brake valves require periodical cleaning which, with devices at present in use, necessitates bringing the cars into the shops which entails considerable loss of time and car service.

With my compact and portable device the cleaning of strainers may be performed while the car (whose brake valve strainer needs cleaning) is coupled in a train by simply removing the strainer from the brake valve and placing it in the cage portion of the combined cage and rotor. This is readily accomplished by swinging the free end of lever 19 upwardly thereby releasing and lifting cover 15, removing cap member 40 and screwing it back into place with its rib 41 in firm engagement wiht the upper end of the inserted strainer which at its lower end is seated on annular rib 39. The cover or lid 15 is then locked in closed position and the lower inlet 25 may be connected to the air line of the train, or any other source of compressed air supply. Upon opening the usual valve in the air line, air under pressure enters chamber 26, a portion flows upwardly into the hollow spindle 31,—a second portion of air flows through passage 28, 29 and is delivered in a tangential direction against the vanes 37 of the rotor by means of port 30,—while a third portion flows upwardly through passage 27, 12 and is tangentially delivered against the outer surface of the strainer and the cage and also sweeps the side walls of the main chamber by means of the elongated port or slot 13 which extends substantially throughout the strainer holding upper portion of the chamber 11 of the main casing.

The elongated port or slot 13 is preferably arranged to discharge the chamber wall sweeping current in the general direction of rotation of the strainer holding cage and induces the dust or dirt laden air or medium coming through the strainer to flow toward the discharge outlet 14.

As is apparent from the drawings, a positively rotating strainer holding cage is provided whereby the entire strainer is successively brought into the path of the pressure medium or air blast issuing from the elongated port 32 in the stationary spindle 31, effecting a thorough cleaning of the strainer without the necessity of uncoupling the cars or shifting the cars into the shops; the cleaning operation in the manner described being made possible by my improved portable cleaning device.

What I claim is:

1. A device of the character described comprising a casing provided with a cylindrical chamber open at the top and having a discharge opening through one side of the casing and upwardly disposed passages in the opposite side of the casing terminating in ports communicating with said chamber at an angle to the diameter thereof; a chambered bottom member for said casing, having an inlet opening adapted to be connected with a pressure medium supply and provided with a hollow spindle disposed centrally upward in the casing chamber and having a discharge port in its side, the lower end of the hollow spindle being in communication with the chamber in said bottom member; a combined rotor and strainer holding cage rotatably mounted on said spindle within the casing chamber, the upper cage portion being adapted to hold a cylindrical strainer, while the lower portion is provided with a plurality of circumferentially arranged vanes; and means adjustably secured to said cage whereby the cylindrical strainer is immovably held in said cage portion; the bottom member having passages for establishing communication between the chamber in the bottom member and said upwardly disposed passages in the casing wall, whereby medium under pressure from the chamber in the bottom member will discharge against the vanes and cause the strainer holding cage to revolve about the spindle, a second portion of the medium will discharge through the port in the spindle and made to pass through the strainer, while a third portion of said medium will discharge into said casing chamber against the outer surfaces of the strainer and cage.

2. A cleaning device of the character described

comprising a casing with a cylindrical chamber, an outlet through the side wall and pressure medium passages in the side wall terminating in tangentially disposed ports communicating, respectively, with the lower end of said chamber and with the upper part of the chamber; a cover for the top of the casing; a bottom member for the casing provided with a hollow spindle disposed upwardly in the chamber and closed at its upper end and having an elongated discharge port in its side, the bottom member having a pressure medium receiving chamber arranged in communication with the passages in the casing wall and with the lower end of said spindle; a strainer holding open-sided cage rotatably mounted on the spindle so as to rotate thereabout, said cage being provided with a turbine wheel arranged to receive the pressure medium discharged through one of said tangential ports; and a cap, adjustably mounted in the upper end of the cage, provided with an annular strainer holding surface.

3. A cylindrical strainer cleaning device comprising a casing with a cylindrical chamber open at top and having an outlet in the side and inlet ports in the side wall arranged tangentially to the diameter of the chamber, one of said ports extending vertically throughout the upper part of said chamber; a bottom member secured to the lower end of the casing and provided with a hollow spindle disposed upwardly in said chamber and closed at its upper end, the side of the spindle having an elongated port extending lengthwise of the spindle, the bottom member having a pressure medium receiving inlet arranged in communication with the ports in the chamber side wall and with the bottom of said hollow spindle; a strainer holding rotor disposed about said spindle and provided with an annular row of vanes which are arranged in the path of the medium discharged by one of said first mentioned inlet ports and the rotor rotated thereby; and means at the upper and lower ends of said rotor for closing and holding the ends of the cylindrical strainer.

4. A strainer cleaning device comprising a casing with a cylindrical chamber provided with an outlet in its side wall and with pressure medium passages, one of said passages terminating in a tangential port communicating with the lower end of the chamber while the other passage terminates in a vertically elongated port discharging into the upper part of said chamber; a bottom member for the casing provided with a chamber common to said passages and having an inlet adapted to have communication with a supply of cleaning medium under pressure, the bottom member having an upstanding hollow spindle disposed vertically in said cylindrical chamber and having a vertically extending port in its side; a strainer holding cage rotatably mounteed on the lower end of said spindle and provided with a turbine wheel at its lower end adapted to be driven by the pressure medium discharged by said first mentioned passage; a closure member for the upper end of the cage, the closure member and the lower end of the cage having annular surfaces for engaging the ends of a cylindrical strainer and to close the ends of the central portion thereof; and a closure member for the upper end of said casing.

5. A portable cylindrical strainer cleaning device comprising a casing with a cylindrical chamber provided with an outlet in the side wall and with ports in the opposite side wall arranged tangentially to the diameter of the chamber, one of said ports communicating with the lower end of the chamber while the other port extends vertically throughout the strainer receiving portion of the chamber; a bottom member for the lower end of the casing provided with a hollow spindle disposed upwardly in said chamber and provided with an elongated slot in its side wall, the bottom member having a pressure medium receiving opening communicating with said ports and with the spindle; a strainer holding skeleton cage rotatably mounted on said spindle and provided with a plurality of vanes circumferentially arranged about the lower end of the cage and in the plane of said first mentioned port so as to be rotated by the pressure medium discharging through said port; means at opposite ends of said cage for engaging and closing the ends of the strainer; and a closure member for the upper end of the casing.

6. A cylindrical strainer cleaning device comprising a casing with a cylindrical chamber having an outlet while the bottom is provided with an inlet opening adapted to be connected with a source of pressure medium supply, the bottom having a stationary hollow spindle open at the bottom and disposed upwardly in the chamber with an outlet port in its side while the bottom communicates with the inlet opening in the bottom, the casing side wall and the bottom having passages connected with the inlet opening in the bottom and terminating in tangentially arranged ports discharging into the bottom of the chamber and in the upper part of the chamber; a strainer holding skeleton cage disposed about said spindle, having a removable cap adjustably secured to the top and provided with a turbine-wheel at its bottom, anti-friction bearings between the lower end of said cage and the spindle to permit the cage to rotate about the spindle, the relation between the inlet opening in the bottom, the lower open end of the spindle and said passages being such that a portion of the incoming pressure medium will be discharged against the turbine-wheel and cause the cage to rotate, a second portion will flow upwardly into the spindle and be discharged through its port and radially through the strainer mounted in the cage, while a third portion will be discharged in the upper part of the chamber and direct the dust laden air toward the outlet.

7. In a strainer cleaning device, an AB brake valve cylindrical strainer holding cage member open at the top and provided with enlarged openings in its side wall and having a bottom wall, below the side wall openings, provided with a central opening surrounded by an annular upstanding rib, the lower side of said bottom being provided with a depending hub portion disposed about said opening and provided with vertically disposed and circumferentially arranged vanes integral therewith; and an adjustable top for the cage member provided on its lower side with an annular rib concentric and corresponding with the first mentioned rib whereby the cylindrical strainer is held against movement and a closure for the central portion thereof at each end is provided.

8. A device of the character described comprising a casing with a cylindrical chamber provided with a removable top, with a discharge opening in one side wall and with pressure medium receiving passages in the opposite side wall, one of said passages terminating in a tangentially arranged port discharging into the upper part of said chamber, while the other passage terminates in a tangentially discharging port in the lower

part of the chamber; a bottom member removably secured to the casing to provide a closure for the cylindrical chamber, said bottom member being cored to provide a chamber common to all of said passages and having an inlet to the chamber and a hollow spindle integral with the top of the member, the lower end of the spindle being in communication with said chamber and closed at its top, said spindle being disposed centrally upward in said casing chamber, the side of the spindle having an elongated discharge port; a strainer holding cage, supported by and rotatably mounted on said spindle, provided with a strainer supporting bottom wall and a plurality of vanes beneath said bottom wall adapted to be disposed in the path of the pressure medium discharging from the port in the lower part of the chamber, whereby rotation of the cage is induced; and means whereby the upper end of the cage is closed and the strainer to be cleaned held in non-movable relation with the bottom end of the cage.

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