April 11, 1933. N. L. SNOW 1,903,486

BOILER CLEANER

Filed Oct. 30, 1924 3 Sheets-Sheet 1

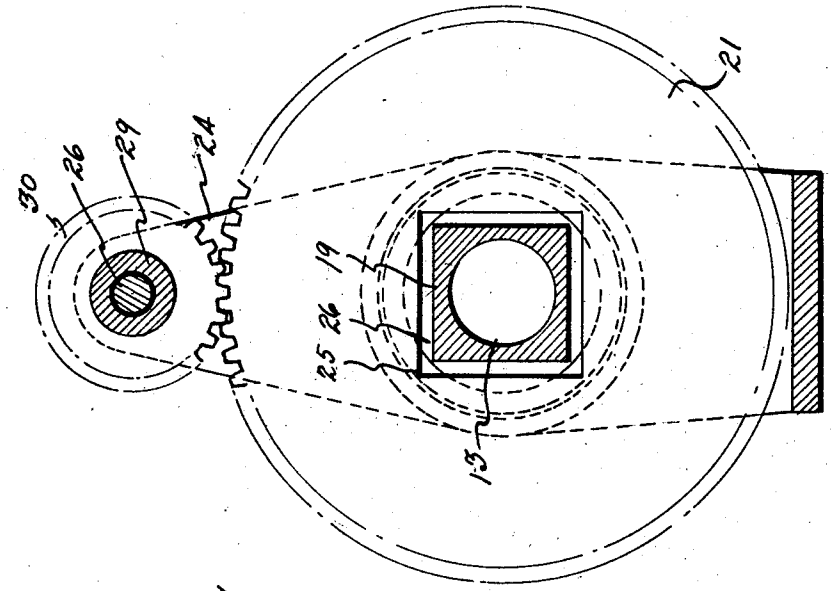


Fig. 2

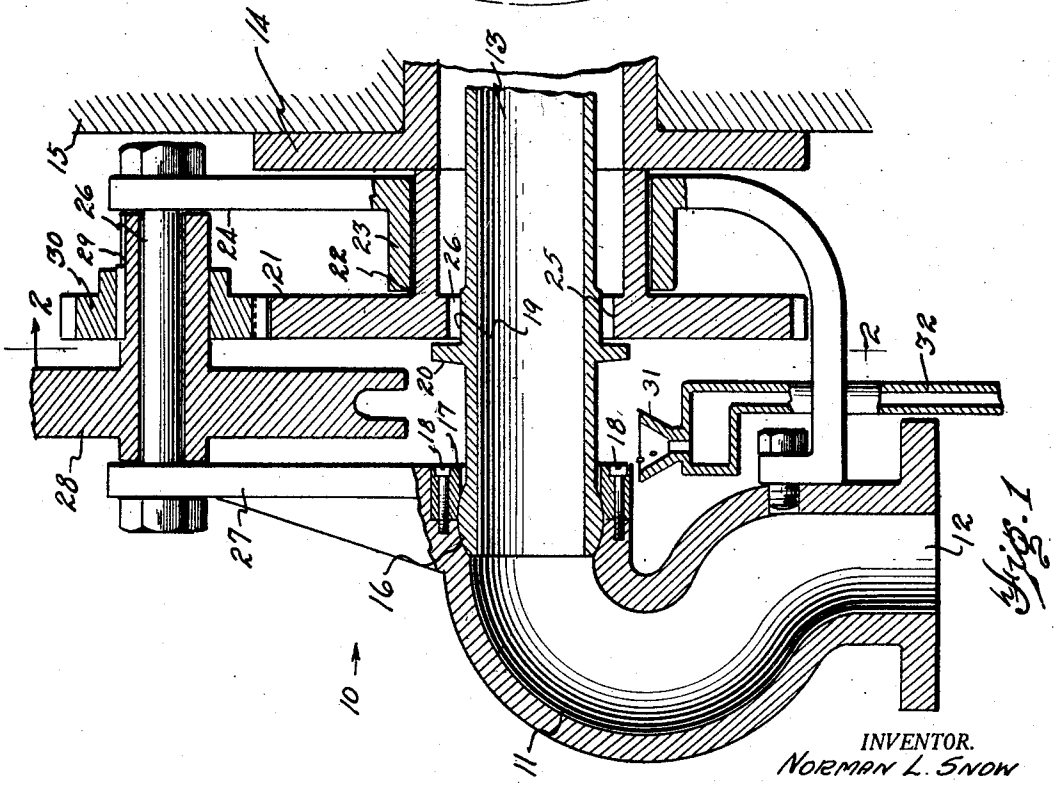


Fig. 1

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BOILER CLEANER

Filed Oct. 30, 1924 3 Sheets-Sheet 2

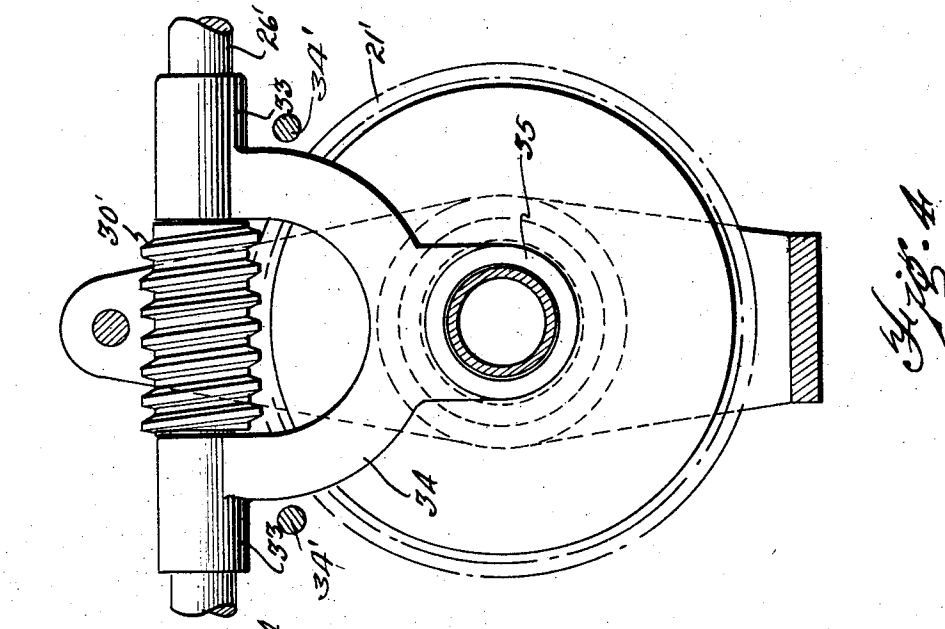


Fig. 4.

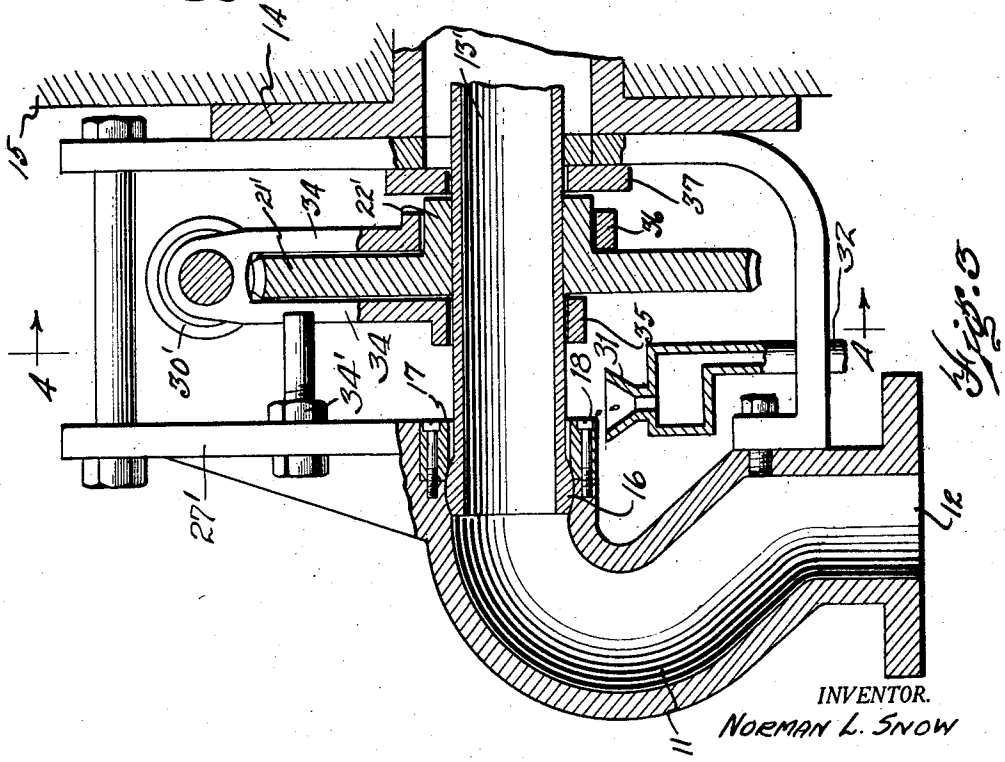


Fig. 3.

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BOILER CLEANER

Filed Oct. 30, 1924 3 Sheets-Sheet 3

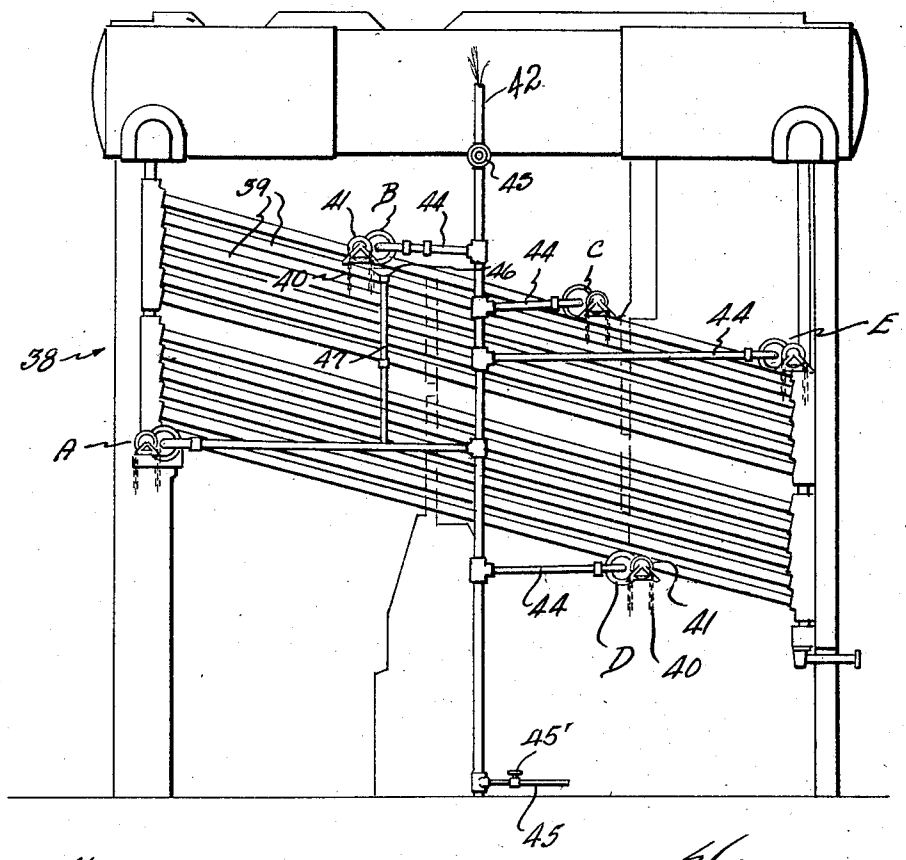


Fig. 5

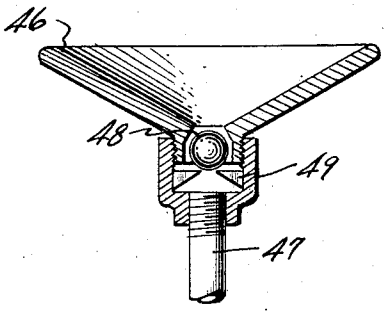


Fig. 6

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UNITED STATES PATENT OFFICE

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BOILER CLEANER

Application filed October 30, 1924. Serial No. 746,904.

The invention relates to boiler cleaners and has among its objects to provide an improved drive for soot blower elements or the like.

Referring to the drawings:

Figure 1 is a sectional view showing one embodiment of my invention;

Figure 2 is a sectional view along the line 2—2 of Figure 1;

Figure 3 is a sectional view of a modified form of my invention;

Figure 4 is a sectional view along the line 4—4 of Figure 3;

Figure 5 is a view showing one application of my drip collector to a boiler cleaner system, and

Figure 6 is a detail view of the drip cup.

In the drawings reference character 10 indicates a blower head having goose neck 11 for conveying cleaning fluid such as steam, air, etc., from a source at 12 to the blower cleaner element 13 which extends through wall box 14 projecting through the boiler setting or wall 15. The element 13 is of lesser diameter than that of wall box 14 thus affording clearance between these parts as shown in Figure 1. The element 13 is adapted to project through wall 15 and is preferably provided with one or more nozzles (not shown) for directing the cleaning fluid to the boiler tubes and other parts of the boiler to be cleaned in accordance with the usual practice.

The element 13 is connected to the goose neck 11 by a ball and socket connection 16, a ring 17 secured by screws 18 being adapted to hold the parts in proper relation. Element 13 is also provided with a squared portion 19 adjacent a shoulder 20, the latter laterally positioning a gear 21 mounted by a forwardly extending hub portion 22 within bearing 23 formed by the bracket 24. Gear 21 is also provided with an opening 25 shaped to correspond with the portion 19 of element 13 but affording a clearance 26 between the gear 21 and element 13.

A shaft 26 is supported at one end by the bracket 24 and at the other end by a second bracket 27. A chain sheave 28 is rotatably mounted on the shaft 26 and keyed to a hub 29 of the sheave is a pinion 30 meshing with the gear 21.

In operation the chain sheave 28 is rotated or oscillated to cause pinion 30 to rotate the gear 21. The latter drives the element 13 by reason of the squared portion 19 whereby the element 13 is rotated or oscillated during the cleaning period. The ball and socket joint at 16 constitutes a support permitting "floating" of the element 13, the loose square drive from gear 21, with the clearance 26, permitting movement of the element 13 without any tendency to displace gear 21 and pinion 30.

It is obvious that other forms of loose drives might be readily substituted for the specific square-shape drive 19 as shown in Figure 1. For example, the surface 19 might assume the shape of any polygon or other contour which would afford a drive with a clearance, such as at 26, for permitting relative movement between the element 13 and gear 21.

Referring to Figures 3 and 4, I have shown a modification of my invention in which the blower element 13′ is supported as before by a ball and socket joint 16. However, instead of floating the blower element freely with respect to the driving gear, as shown in Figure 1, in the construction shown in Figure 3 the driving worm gear 21′ and worm 30′ are floated with the blower element 13′. Shaft 26′, which may be driven by a chain sheave as before, or other suitable means, is mounted in the bearings 33 supported by bracket arms 34 terminating in bearing portions 35 and 36 loosely embracing the element 13′ and hub 22′ respectively. For preventing a downward swinging of the bracket arms 34, pins 34′ may be mounted on the bracket 27′, these pins projecting on opposite sides of the said bracket arms 34 as will be readily apparent by reference to Figures 3 and 4. Plate 37, carried by element 13′ is mounted for sliding movement relative to the boiler wall and is adapted to seal the opening between the element and the wall box 14.

In operation the shaft 26′ is rotated or oscillated to act through worm 30′ and gear 21′ upon the element 13′ for directing the cleaning fluid toward the parts of the boiler to be

cleaned, as before. The blower element 13′, by reason of the ball and socket joint 16 and the clearance provided in the wall box 14, is free to "float" with respect to the blower head, the blower element 13′ carrying therewith as a unit the shaft 26′, worm 30′, gear 21′ and bracket arms 34.

A cup 31 (Figures 1 and 3) is preferably located below the joint between element 13 and its connection with the blower head 10 so as to catch any drip of the cleaning fluid which would otherwise fall upon the operator below. Where steam is employed as a cleaning fluid medium a drain of this character is especially desirable. A pipe 32 serves to conduct the drainage or drip to any suitable point.

Referring to Figures 5 and 6, I have shown a modified form of a drip collecting means. In these views 38 indicates a boiler having boiler tubes 39 suitably located at various points for cleaning the boiler tubes and other parts of the boiler are the blower units A, B, C, D and E preferably of the type employing a valve operated to admit cleaning fluid to the blower element simultaneously with the rotation of the blower element by reason of the chains 40 acting on the sheaves 41. The blower units A, B, etc., are supplied with cleaning fluid from a main supply pipe 42, past the main control valve 43, and thence to the branch pipes 44. A pipe 45 collects and removes the drainage from the system and a manually controlled valve 45′ is provided for controlling the discharge through this pipe.

Below each unit, as illustrated in connection with the unit B, is a cup or receptacle 46 suitably positioned to catch the drip from the unit. The cup is connected by a pipe 47 preferably with a branch pipe 44 below the units, the passage between the cup 46 and pipe 47 being controlled by a ball 48 normally resting against the ball rest 49 when valve 43 is shut, allowing any drip collected in the cup 46 to drain off through pipe 47.

In operation when it is desired to clean the boiler the valve 43 is opened to admit cleaning fluid into the branch pipes 44, the cleaning fluid also acting through pipe 47 to force ball 48 upwardly to prevent escape of cleaning fluid by way of the pipe 47.

The blower units A, B, etc., are then operated to successively rotate their respective blower elements and unseat the valve controlling passage of steam from the branch pipes 44 to the blower elements. Any drip escaping during the blowing operation will be caught and collected in the cup 46. When the blowing operation is over, the valve 43 is shut off thus releasing the pressure in pipe 47 thereby permitting ball 48 to drop to the ball rest 49. The drip accumulated in cup 46 will then drain through pipes 47, 44, 42 and 45.

By the term "rotate" as used in the specification and claims I mean one or more partial or complete rotations of the parts designated or oscillations of such parts.

The invention has, for the purpose of illustration, been described as a boiler cleaner adapted to clean parts of a boiler. It will be apparent, however, that the invention will find equal utility in cleaning any similar apparatus and it is to be therefore understood that the term "boiler" wherever used in the specification or claims is to be construed as meaning a heat transfer apparatus or fluid heater of any character, and the term "boiler cleaner" is to be construed as meaning a cleaner for any such apparatus.

What I claim as my invention is:—

1. In a boiler cleaner, a blower head, a rotatable cleaner element, a gear mounted on the cleaner element for rotating the same, a driving worm meshing with the gear, and means for mounting said cleaner element, worm and gear for floating movement with respect to the blower head.

2. In a boiler cleaner, a blower head, a rotatable cleaner element, a gear mounted on the cleaner element for rotating the same, a driving worm meshing with the gear, a frame supporting the worm in relation to the gear and cleaner element said cleaner element, frame, gear and worm being floated as a unit with respect to the blower head.

3. In a boiler cleaner, a valve controlled supply pipe for cleaning fluid, a blower cleaner unit communicating with said supply pipe, a cup positioned to catch the drip of cleaning fluid from said unit, a drain connection from said cup to said supply pipe, means for draining said supply pipe, and means for automatically closing the said connection when the valve is opened in the supply pipe.

4. In a boiler cleaner, a valve controlled supply pipe for cleaning fluid, a blower cleaner unit communicating with said supply pipe, a cup positioned to catch the drip of cleaning fluid from said unit, a drain connection from said cup to said supply pipe, means for draining said supply pipe, and means for automatically closing the said connection when the valve is opened in the supply pipe, said means including a valve operable by the pressure of the cleaning fluid in the said supply pipe.

5. In a boiler cleaner, a blower head, a rotatable cleaner element, a bracket loosely mounted on said cleaner element, and means carried by the said bracket for rotating the said cleaner element, the said cleaner element, bracket, and cleaner element rotating means being floated as a unit with respect to the blower head.

6. In a boiler cleaner, a blower head, a rotatable cleaner element, a bifurcated bracket loosely mounted on the said cleaner element, a worm carried by the said bracket, and a

gear carried by the said cleaner element and arranged between the furcations of the said bracket for engagement with the said worm, the said bracket, gear, worm and cleaner element all being floated as a unit with respect to the blower head.

7. In a boiler cleaner, the combination with a boiler wall, a blower head, and a rotatable cleaner element journaled in said blower head and projecting through said wall for discharging jets of cleaning fluid adjacent portions of the boiler to be cleaned, said cleaner element being mounted for floating movement relative to said wall and also relative to said blower head, of a gear on said cleaner element for rotating the same, and a worm for driving said gear, said worm and gear being mounted for floating movement with said cleaner element.

8. In a boiler cleaner, a blower head, a cleaner element having one end journaled in said head for substantially universal movement relative thereto, and a blower element driving member carried by said head and loosely embracing said blower element, said blower element being movable relative to said driving member in a direction to provide for said universal movement.

9. In a boiler cleaner, a blower head, a cleaner element having one end journaled in said head for substantially universal movement relative thereto, and a driving member carried by said head, said driving member being provided with an opening loosely but non-rotatably receiving said cleaner element whereby rotation of said driving member effects a rotation of said cleaner element and said universal movement is provided for.

10. In a boiler cleaner, a blower head, a cleaner element rotatably journaled in said head for substantially universal movement relative thereto, said cleaner element having a portion of its outer periphery of angular cross sectional shape, and a driving member carried by said blower head having an opening of angular cross sectional shape for loosely receiving the said portion of the blower element to provide for lateral movement of said cleaner element relative to said driving member while providing for rotation of said cleaner element by said driving member.

11. In a boiler cleaner, a blower head, a cleaner element rotatably journaled in said head for substantially universal movement relative thereto, said cleaner element having a portion of its outer periphery of substantially square cross sectional shape, a bracket carried by said head, and a driving member journaled in said bracket and having a substantially square opening for loosely receiving the square portion of said cleaner element.

12. In a boiler cleaner, the combination with a blower head located exteriorly of the boiler setting, a cleaning fluid supply pipe for said blower head, a drain pipe for said supply pipe, and a blower element projecting through said boiler setting and journaled in said head for receiving cleaning fluid therefrom, of means located exteriorly of said head for collecting the cleaning fluid escaping past the moving parts of said head and for conducting the same to said drain pipe.

13. In a boiler cleaner, the combination with a blower head located exteriorly of the boiler setting, a cleaning fluid supply pipe for said head, a drain pipe for said supply pipe, and a blower element projecting through said boiler setting and journaled in said head for receiving cleaning fluid therefrom, of a receptacle located exteriorly of said head for collecting the cleaning fluid escaping past the moving parts of said head, and means for conducting the escaped cleaning fluid from said receptacle to the said drain pipe.

14. In a boiler cleaner, a blower head, a cleaner element having one end connected to said head for universal movement with respect thereto, a bracket supported by the blower head, a member having a bearing in said bracket for rotating said cleaner element, said member being normally axially aligned with the axis of the cleaner element, and a loose driving connection between said member and said cleaner element providing for relative displacement of the axes of said member and cleaner element.

15. In a boiler cleaner, a blower head, a cleaner element having one end connected to said head for universal movement with respect thereto, a bracket supported by the blower head, a member having a bearing in said bracket for rotating said cleaner element, said member being normally axially aligned with the axis of the cleaner element, a loose driving connection between said member and said cleaner element providing for relative displacement of the axes of said member and said cleaner element, a shaft carried by the blower head, means for rotating said shaft, and means for transmitting the movement of the shaft to the said member for rotating the latter.

16. In a boiler cleaner system, a pair of blower units, a combined cleaning fluid supply and drain pipe for both of said units, a rotatable cleaner element carried by each unit, a cup positioned to catch the drip of cleaning fluid escaping from one of said units, a connection between said cup and said cleaning fluid supply and drain pipe, and a valve in said connection operable to prevent the escape of cleaning fluid from said connection when cleaning fluid is flowing through said supply and drain pipe and to provide for draining the drip from the cup through the said connection when the flow of cleaning fluid through the supply and drain pipe is cut off.

17. In a boiler cleaner system, a combined supply and drain pipe for cleaning fluid, a valve controlling the admission of cleaning fluid to said pipe, a plurality of blower cleaner units communicating with said pipe, a cup positioned to catch the drip of cleaning fluid from one of said units, a drain connection from said cup to said pipe, and means for automatically closing the said connection when the valve is opened to the pipe.

18. In a boiler cleaner, a combined cleaning fluid supply and drain pipe, a blower unit communicating with said pipe, a cup positioned to catch the drip of cleaning fluid from said unit, a connection between said cup and said pipe, and a valve in said connection operating to prevent the escape of cleaning fluid from said connection when the blower unit is in operation and to permit draining the drip from the cup through the said connection when the blower unit is inoperative.

In testimony whereof I affix my signature.

NORMAN L. SNOW.