

C. C. DE WITT.
HYDROPNEUMATIC WINDOW CLEANING APPARATUS.
APPLICATION FILED FEB. 26, 1914.

1,114,592.

Patented Oct. 20, 1914.

2 SHEETS—SHEET 1.

Fig. 1

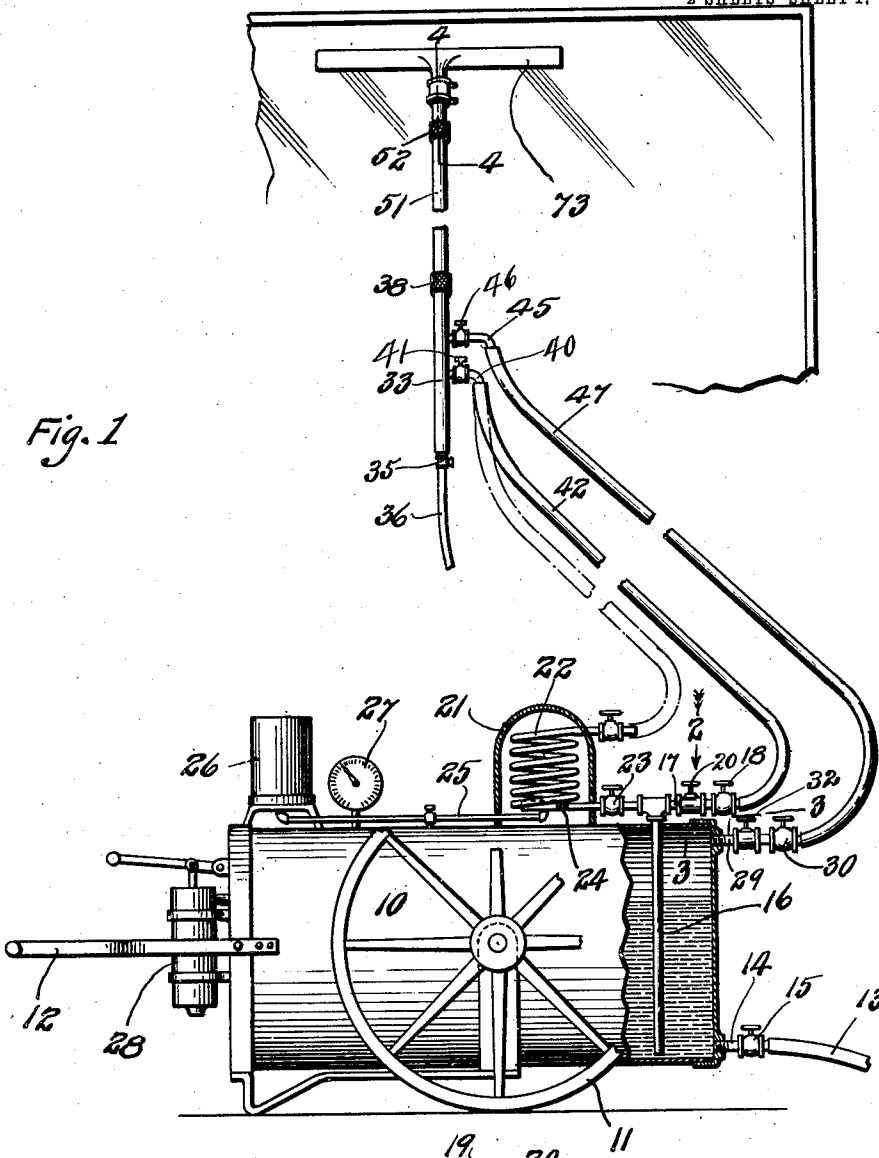


Fig. 2

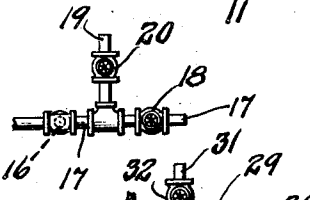
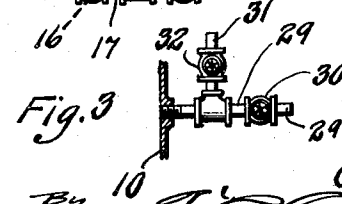


Fig. 3



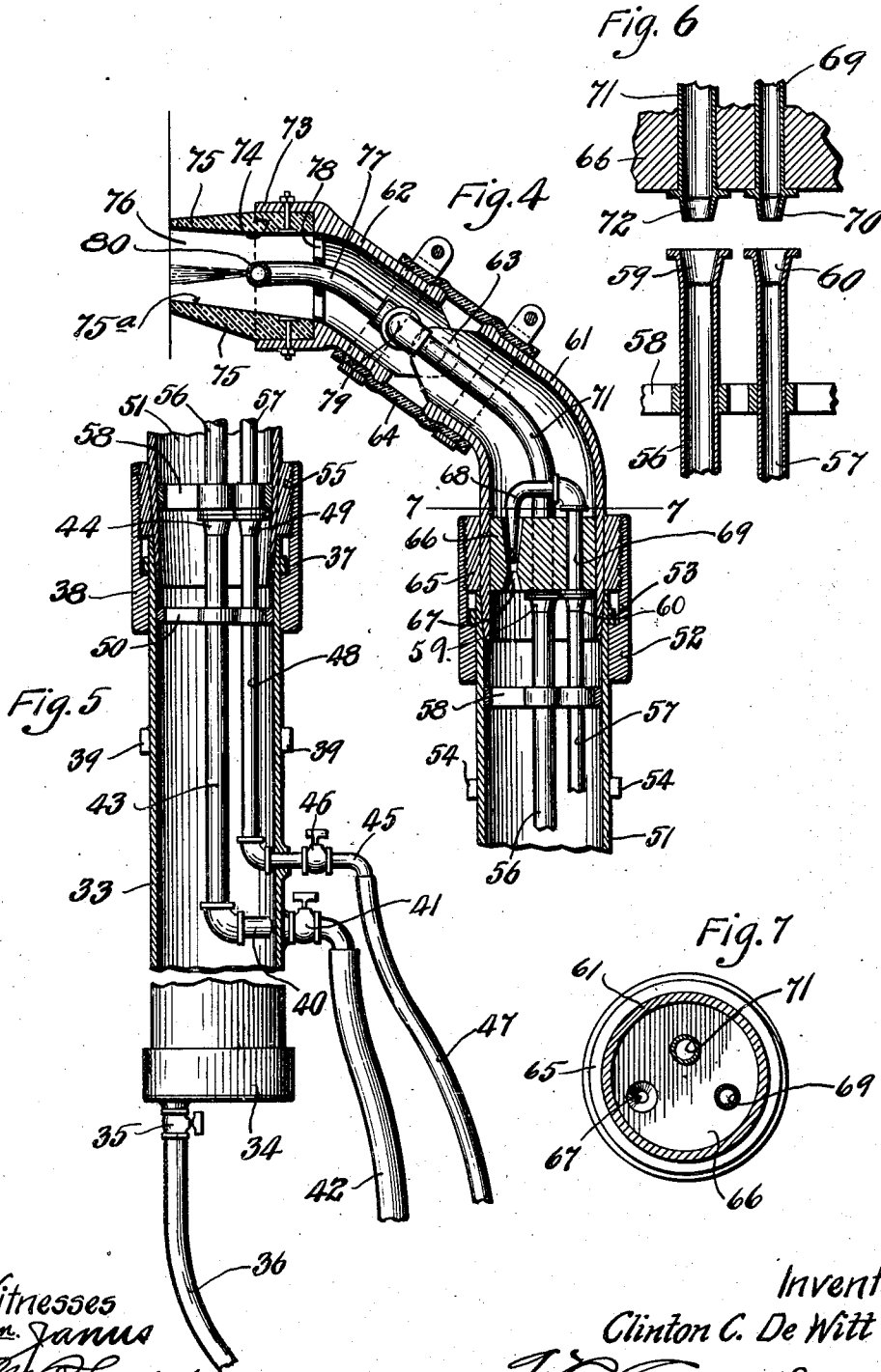
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UNITED STATES PATENT OFFICE.

CLINTON C. DE WITT, OF SHREWSBURY PARK, MISSOURI.

HYDROPNEUMATIC WINDOW-CLEANING APPARATUS.

1,114,592.

Specification of Letters Patent.

Patented Oct. 20, 1914.

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To all whom it may concern:

Be it known that I, CLINTON C. DE WITT, a citizen of the United States, residing at Shrewsbury Park, St. Louis county, Missouri, have invented a certain new and useful Improvement in Hydropneumatic Window-Cleaning Apparatus, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to a new and useful apparatus for cleaning windows, the principal object of my invention being to provide a comparatively simple and portable apparatus, specially designed for cleaning large plate glass windows which are now commonly used in the construction of store fronts.

Under the present methods of washing large windows it very frequently happens that the water used in cleaning operation runs down onto the woodwork or masonry beneath the windows, thereby discoloring the same and in the cold season of the year and during the periods of freezing temperature, the water runs down onto the sidewalk and freezes, thereby causing icy surfaces which are a menace to pedestrians.

It is the purpose of my invention to provide an apparatus wherein water will be forcibly thrown onto the surface of the glass to cleanse the same and which water is carried back through the handle of the cleaning or washing implement to be discharged into the gutter or a suitable waste receptacle.

My invention includes, with numerous minor elements, a portable tank adapted to receive water to be used in the washing operations, which water is under air pressure in order that it may be forcibly discharged onto the surface of the windows; a squilgee or cleaning implement, the same being hollow so as to provide a pair of flexible glass engaging lips which, during upward or downward movement upon the glass removes dirty water therefrom; a sectional handle for the squilgee, which handle is provided with a sectional water tube having connection to the water tank, and leading upwardly into the squilgee; an air pipe leading from the air chamber in the water

tank upwardly through the sectional handle for the purpose of creating a partial vacuum or suction through the squilgee to draw the dirty water into the handle; means for forming and maintaining the joints between the water and air pipes carried by the sections of the handle; means for heating the water prior to its delivery and discharge into the squilgee, and means for creating air pressure within the water tank.

In the drawings—Figure 1 is an elevational view of my improved window cleaning apparatus, parts thereof being broken away and in section in order to more clearly illustrate the invention. Fig. 2 is a plan view of certain of the tubular connections and valves forming a part of my improved apparatus. Fig. 3 is a horizontal section taken approximately on the line 3—3 of Fig. 1. Fig. 4 is an enlarged vertical section taken approximately on the line 4—4 of Fig. 1, and showing the squilgee forming a part of my improved apparatus. Fig. 5 is an enlarged vertical section taken through the lower portion of the tubular handle of the squilgee. Fig. 6 is a detail sectional view showing the connections between the air and water tube which are located within the sections of the handle. Fig. 7 is an enlarged horizontal section taken approximately on the line 7—7 of Fig. 4.

Referring by numerals to the accompanying drawings, 10 designates an air and water tight tank which is mounted upon suitable wheels 11 and having at one end a handle 12 whereby said tank may be readily moved from one point to another as required for use. This tank is adapted to be filled or partially filled with water by means of a flexible connection 13 which leads from a hydrant connected to the city main to a nipple 14, which latter is seated in one end of the tank and provided with a valve 15.

A water discharge pipe 16 leads from a point near the bottom of the tank 10 to the exterior thereof, and suitably connected to the outer end of this pipe is a short horizontally disposed pipe 17 in which is located a valve 18, and leading from said pipe 17 is a short branch pipe 19 provided with a valve 20.

Located on top of the tank 10 within a suitable housing 21 is a heating coil 22, the lower end of which is extended beyond the housing 21 and connected to the upper end

of discharge pipe 16, and located in the extension between said coil and the pipe 16 is a valve 23.

5 The coil 22 is heated in any suitable manner, preferably by means of a liquid hydrocarbon burner 24, the same being connected to a supply pipe 25 which leads from a small tank 26.

10 Located on top of the tank 10 is a suitable pressure gage 27 and located at the end of said tank is a small air pump 28 which has a tubular connection with the interior of tank 10 and which pump is adapted to be operated by hand for pumping up pressure 15 within said tank.

Leading from the upper portion of tank 10 is a short pipe 29, the same being provided with a valve 30 and leading from this pipe is a branch pipe 31 which is provided 20 with a valve 32.

The squilgee or cleaning tool and handle therefor are made in sections in order that the handle can be lengthened or shortened as required for service upon windows of 25 different heights, and the lower end section of the handle comprises a tube 33, the lower end of which is closed in any suitable manner, preferably by means of a cap 34, the same being provided with a nipple in which 30 is located a valve 35.

When the device is in use one end of a flexible tube 36 is connected to the discharge nipple on the cap 34, and the free end of said flexible tube is arranged to discharge 35 into the gutter or a suitable receptacle.

Fixed on the upper portion of the tube 33 is a ring 37 and loosely mounted on said tube below this ring is a collar 38, the upper end of which is internally screw threaded. 40 The collar 38 is prevented from dropping downward upon the tube 33 by lugs 39 which are positioned on said tube a short distance below the ring 37.

Located in the lower portion of the tube 33 is a nipple 40 in which is located outside 45 said tube a valve 41 and when the apparatus is in use one end of a flexible tube 42 is connected to the outer end of the nipple 40 and the opposite end of said tube is connected to the end of the pipe 17 or to the end of branch pipe 19. Connected to the nipple 40 within the tube 33 is a water tube 43, the upper end of which terminates at or 50 near the upper end of the tube 33 and is provided with a tapered seat 44.

55 Seated in the lower portion of tube 33 is a short nipple 45 provided with a valve 46, and connected to the outer end of this nipple is the upper end of a flexible tube 47, the lower end of which is adapted to be 60 connected to the outer end of tube 29 or branch tube 31. Connected to the inner end of the nipple 45 and leading upwardly through the tube 33 is a small air pipe 48, 65 the upper end of which terminates in the

same plane with the upper end of tube 43, and the upper end of said air pipe is provided with a tapered seat 49.

A bracket or spider 50 is arranged in the upper portion of tube 33 for fixedly holding 70 the upper portions of tubes 43 and 48.

The handle of my improved cleaning device includes one or more intermediate sections, each of which comprises a tube 51 on the upper end of which is loosely mounted a 75 collar 52, the upper portion of which is internally screw threaded. This collar is adapted to bear against a ring 53 which is fixed on the upper portion of tube 51 and said collar is prevented from dropping 80 down upon said tube by lugs 54 located a short distance from the ring 53.

The lower end of tube 51 is adapted to fit snugly within the upper end of tube 33 as 85 seen in Fig. 5, and fixed on the lower portion of tube 51 is a ring 55 which is externally threaded so as to receive the internally threaded upper end of collar 38.

As collar 38 is screwed upon the ring 55 90 the shoulder within said collar will bear against the ring 37 thereby drawing the lower end of the tube 51 downward into the upper end of tube 33, thereby forming an air and water tight joint between said tubes. Located within tube 51 is a water tube 56 95 and an air tube 57, the same corresponding with the water and air tubes 43 and 48 in the lower section of the handle. These tubes 56 and 57 are held in position within tube 51 by suitable spiders or brackets 58, 100 and the lower ends of said tubes are tapered so as to fit snugly within the tapered seats 44 and 49 at the upper ends of tubes 43 and 48, thereby forming air and water tight joints between the corresponding sections 105 of tubes when the lower end of the intermediate section of the handle is connected to the lower section.

The upper ends of tubes 56 and 57 are provided respectively with tapered seats 59 110 and 60 which are adapted to receive the lower ends of corresponding tubes carried by the upper section of the cleaner handle. This upper section is made in two parts 61 115 and 62, the same being connected by a suitable flexible joint 63, the same being made air and water tight in any suitable manner, preferably by means of a surrounding tubular member 64 of rubber or fabric, the ends 120 of which are attached in any suitable manner to the adjacent ends of the sections 61 and 62. The upper portion of the lower section 61 is bent so that it occupies an angle of approximately 45° with respect to a horizontal plane, and the lower end of said 125 lower section is provided with a threaded ring 65 which is adapted to receive the internally threaded upper end of collar 52.

When the parts are properly assembled, the lower end of the lower section 61 fits 130

snugly within the upper end of the intermediate tubular section 51, thus forming an air and water tight joint between said parts. Seated in the lower portion of the section 5 61 is a block 66 through which is formed a tapered aperture 67, and projecting into said tapered aperture is a tapered tubular nozzle 68, the same being connected to the upper end of a short tube 69 which is seated 10 in the block 66. The lower end of this tube 69 projects a short distance below the block 66, and is tapered as designated by 70 so as to fit snugly in the tapered seat 60 in the upper end of air tube 57.

15 The lower end of a water tube 71 is seated in the block 66, which lower end of said tube is tapered as designated by 72 so as to fit snugly in the tapered seat 59 at the upper end of water tube 56.

20 Formed integral with or fixed to the upper end of the upper section 62 is a horizontally disposed housing 73 and seated therein is a hollow squilgee 74, preferably formed of rubber, and comprising outwardly projecting upper and lower lips 75, and end 25 walls such as 76. The projecting lips 75 are spaced apart a suitable distance, and the upper surface of the lower lip is inclined downwardly and rearwardly as designated by 75* in order that water will readily gravitate downwardly over said lower lip, and pass into the tubular section 62.

30 Positioned within the section 62 is a small water tube 77 which is held in a central position by means of a bracket or spider 78, and the lower end of this tube is connected by a flexible joint 79 to the upper end of tube 71. Connected to the upper end of tube 77 is a horizontally disposed tube 80 which 40 extends lengthwise through the squilgee, and said tube is perforated on its front side so as to throw small jets of water directly forward between the lips 75 and onto that portion of the glass or surface which is between 45 the forward ends of said lips.

The operation of my improved apparatus is as follows: Pipe 13 is connected to a hydrant having connection to the city main and when valve 15 is opened water will enter 50 tank 10 and as said water is under certain pressure, air will be compressed in the upper portion of said tank, it being understood, of course, that valves 18, 20, 23, 30 and 32 are closed. Valve 15 is now closed and flexible 55 tube 13 disconnected and the tank is now moved to the point of use and flexible tubes 42 and 47 are connected to tubes 17 and 29 respectively. The upper ends of these flexible tubes are connected to the 60 nipples 40 and 45. The operator now manipulates the tubular handle so that the forward ends of the lips of the squilgee are positioned against the surface of the glass to be cleaned, and valves 18, 30, 41 and 46

are now opened. As valves 18, and 41 are 65 opened, water will pass through tubes 16, 17, 42, 43, 56, 71, and 77, and as said water is under pressure it will be forcibly discharged through the jet openings in tube 80 within the squilgee. This water in jet 70 form is directed onto the surface of the glass between the lips of the squilgee, and as the latter is moved up and down on the surface of the glass, said surface will be 75 cleaned and the water scraped from the surface of the glass will pass backward through the squilgee and discharge downward through tubular members 62 and 61. When 80 valves 30 and 46 are opened air under pressure will pass through tubes 29, 47, 48 and 57, and discharge from nozzle 68 downward through the aperture 67, thereby creating suction through the upper portion of the tool, and as a result, the waste water is 85 caused to discharge downward through the aperture 67 and after passing through the tubular handle will discharge through flexible tube 36 into a suitable receptacle or the gutter.

By providing the flexible joint between 90 the members 61 and 62 the lips of the squilgee remain in contact with the surface of the glass being cleaned during the vertical movement of the tubular handle, and during such movement the angularity of the 95 tubular handle is necessarily changed.

Where it is desired to use two of the cleaning implements on a large window, or on two adjacent windows, the flexible tubes of the second implement are connected to the 100 branch pipes 19 and 31. In extreme cold weather or whenever it is desired to heat the water delivered through the squilgee, the burner 24 is lighted and the flexible tube 42 is connected to the upper end of 105 coil 22. Valves 18 and 20 are closed and valve 23 is opened, and thus the water from the tank 10 passes through the coil 22 wherein it is heated.

In case the air pressure within tank 10 is 110 lowered to such a degree as to be inefficient, the operator by manipulating the handle of pump 28 can pump up additional pressure without necessitating the connection of tube 13 to the hydrant.

115 An apparatus of my improved construction is comparatively simple, can be readily moved from one point to another and provides simple means for delivering cleaning water to the surface of a window, and 120 which water is, after use, carried off and discharged into a suitable receptacle or the gutter.

It will be readily understood that minor changes in the size, form and construction 125 of the various parts of my improved cleaning apparatus may be made and substituted for those herein shown and described, with-

out deperating from the spirit of my invention, the scope of which is set forth in the appended claims.

I claim:

- 5 1. In an apparatus of the class described, the combination with a tank adapted to receive water and compressed air, of a cleaning tool comprising a tubular handle, a hollow squilgee carried by said handle, a water
10 tube passing through the tubular handle for delivering water through the squilgee, an air tube for withdrawing the water from the squilgee and delivering said water into the lower portion of the handle, a tube leading
15 from the handle for carrying off the waste water, and tubular connections from the tank to the air and water tubes in said handle.
- 20 2. In an apparatus of the class described, the combination with a tank adapted to contain water and air under pressure, of a cleaning implement comprising a tubular handle, a hollow squilgee carried thereby, means for conveying water from the tank up through
25 the handle and discharging said water through the hollow squilgee, and a tubular connection from the air compartment within the tank to the tubular handle whereby the waste water after passing through the squilgee is caused to pass downward through the
30 handle of the cleaning implement.
3. In an apparatus of the class described, a cleaning implement comprising a sectional tubular handle, a hollow squilgee carried by
35 the upper end of said handle, a water pipe leading through the tubular handle, a jet pipe located within the squilgee and connected to said water pipe, an air pipe extending through the tubular handle, a jet nozzle connected to said air pipe and arranged to produce suction through the upper end of the
40 tubular handle and the hollow squilgee for drawing the waste water from the squilgee and delivering same into the lower portion of the tubular handle, and means whereby
45 water and air under pressure are delivered to the water and air pipes within the hollow handle.
4. In an apparatus of the class described,
50 a cleaning implement, comprising a tubular handle, a short tubular member located on one end of said handle, in which short member is formed a flexible joint, a hollow squil-

gee carried by the upper end of said short tubular member, and means for delivering water under pressure through the short tubular member and discharging said water through the squilgee.

5. In an apparatus of the class described, a cleaning implement, comprising a tubular handle, a short tubular member located on one end of said handle, in which short member is formed a flexible joint, a hollow squilgee carried by the upper end of said short tubular member, means for delivering water under pressure through the short tubular member and discharging said water through the squilgee, and means within the tubular handle and the short tubular member for creating a partial vacuum within said member, and the squilgee to draw the waste water therethrough and deliver it into the tubular handle.

6. In an apparatus of the class described, a cleaning tool comprising a tubular handle, an elongated housing pivotally connected to one end thereof, and a hollow squilgee seated in said housing.

7. In an apparatus of the class described, a cleaning tool comprising a tubular handle, an elongated housing pivotally connected to one end thereof, a hollow squilgee seated in said housing, which squilgee comprises a pair of flexible lips spaced apart and projecting beyond the housing, and flexible walls connecting the ends of said lips.

8. In an apparatus of the class described, a cleaning implement comprising a tubular handle, a hollow squilgee carried thereby, means for conveying water through the tubular handle and discharging said water through the squilgee, means for delivering air under pressure into the tubular handle near the squilgee for withdrawing the waste water from the squilgee and delivering said water into the lower portion of the tubular handle, and a tube connected to the lower end of said tubular handle for carrying off the waste water.

In testimony whereof I hereunto affix my signature in the presence of two witnesses, this 14th day of February, 1914.

CLINTON C. DE WITT.

Witnesses:

M. P. SMITH,
M. A. HANDEL.