

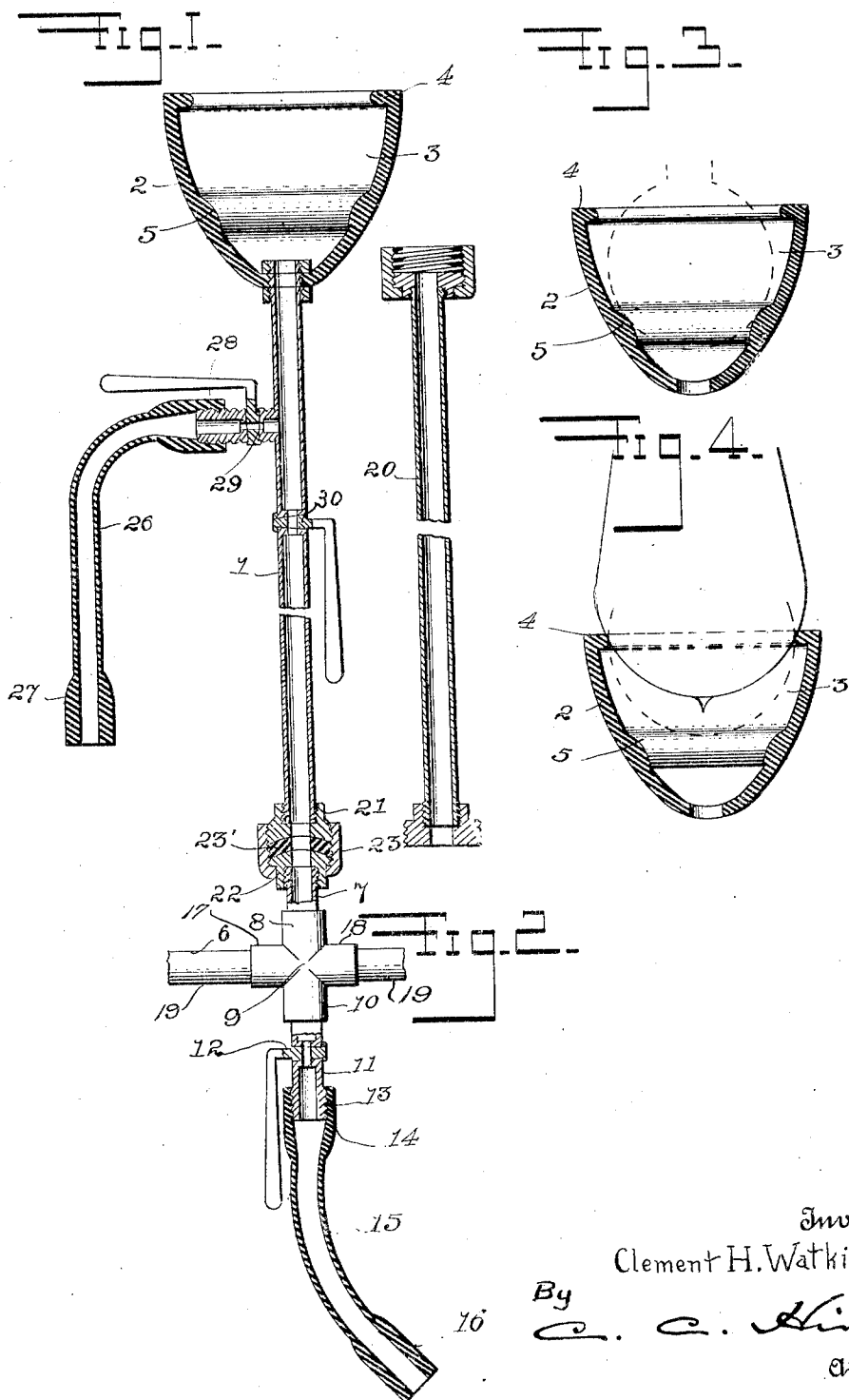
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ELECTRIC LAMP MANIPULATOR

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ELECTRIC-LAMP MANIPULATOR.

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This invention relates to improvements in electric lamp manipulators of that type especially designed for connecting electric light bulbs to or disconnecting the same from ceiling and wall fixtures, and particularly to a device of this character having a vacuum cup gripper to engage the bulb.

One object of my invention is to provide a manipulator of this character which is simple of construction, reliable and efficient in action, and which permits of the exhaust of air and formation of a vacuum in the vacuum line by mouth suction on the part of the operator, thereby admitting of the use of pumps or other inconvenient mechanical exhausting devices to be dispensed with.

A further object of the invention is to provide a device of this character which may be made of comparatively great length, for reaching light fixtures located at high levels, and which nevertheless will operate efficiently under mouth suction.

A still further object of the invention is to provide a lamp manipulator in which the vacuum cup is especially designed and adapted for gripping the different commercial sizes of bulbs within wide limits.

A still further object of the invention is to provide a manipulator which may be easily and conveniently varied in length for the purpose of applying or removing bulbs located at different elevations.

A still further object of the invention is to provide a manipulator having a main suction or exhaust device located at or near its lower or manipulating end, and an auxiliary suction or exhaust device located in more or less close proximity to the vacuum cup end of the device, the main exhaust or suction device being adapted for use for gripping and removing bulbs located at an elevation and the auxiliary suction or exhaust device being provided for convenience in forming a vacuum within a minimum period of time for gripping a bulb which is to be elevated and applied to a light fixture.

A still further object of the invention is to provide a manipulator which will permit bulbs suspended from a flexible light cord or chain to be gripped and removed or applied with facility.

The invention consists of the features of construction, combination and arrangement of parts, hereinafter fully described and

claimed, reference being had to the accompanying drawing, in which:—

Figure 1 is a sectional view through a bulb manipulator constructed in accordance with my invention.

Figure 2 is a view of an extension stem section.

Figure 3 is a view showing the gripping action of the vacuum cup in gripping bulbs of smaller size.

Figure 4 is a view showing in full and dotted lines the gripping action of the vacuum cup in gripping bulbs of larger sizes.

In carrying my invention into practice, I provide a bulb manipulating device or tool comprising a stem 1 of hollow tubing, which is preferably continuous and of any suitable length. This stem carries at its upper end a vacuum gripping cup 2, which is of generally conical form and suitably secured, in an air-tight manner, at its reduced end to the upper end of the stem 1. This cup is made of rubber of a suitable degree of flexibility or pliability, for expanding and contracting actions, and is provided with a bulb receiving cavity 3 of generally conical form. At the upper, widened or mouth end of this cavity the cup 2 is provided with an inturned portion or gripping flange 4, and at a point within the cavity and between this flange 4 and the reduced base of the cavity the cup is provided with a convex auxiliary gripping flange or bead 5. The size and elasticity of the bulb is such that it will expand at its mouth end to receive and grip a bulb of the largest ordinary commercial size, say 250 watts, and the mouth portion is expansible and contractible to such degree as to receive and grip bulbs of different sizes varying from the 75 watt size to the 250 watt size. Figure 4 shows in full and dotted lines the gripping action of the flange 4 on bulbs of the minimum and maximum larger sizes above set forth. The lower portion of the cup provided with the bead or flange 5 is of such size and capable of a degree of expansion and contraction to receive bulbs of a smaller size range, for example, from 25 to 60 watts size, the gripping action on a bulb of one of these sizes being shown in Figure 3, so that by the use of a vacuum cup of a fixed size a wide range of sizes of bulbs may be received and manipulated, thus avoiding the necessity of

using different implements or different sized cups for the purpose.

The stem 1 is provided at its lower end with a handle or manipulating section 6 comprising a connecting tube 7 carried by one of the arms 8 of a four-armed or four-way union or coupling member 9, the diametrically disposed arm 10 of which has fitted therein a nipple 11 provided with a cut off valve or cock 12 and a groove or serrated stem 13, which latter receives a fitting 14 upon one end of a rubber or other flexible exhaust or suction tube 15 provided at its free end with a mouth-piece 16. The laterally extending arms 17 and 18 of the union or coupling 9 have fitted therein short rods or bars 19 forming handles whereby the tool may be manipulated.

The connecting tube 7 may be, if desired, continuous with the stem 1, in which event the lower end of the stem may be permanently fitted in the coupler arm 8, which construction is desirable in the manufacture of a tool of fixed length or of certain lengths within limited ranges, and in which the tool is not designed to be varied as to length for greater convenience in manipulating it and reaching lamps disposed at different elevations. In the present instance, however, the construction is such as to permit of the use between the main stem 1 and the connecting tube 7 of any desired member of extension stem sections 20, such as shown, for example, in Figure 2. To this end, the lower end of the stem 1 has formed thereon or applied thereto one member 21 of a pipe coupling or union, the other member 22 of which is formed upon or carried by the tube 7, said members being connected by a coupling nut 23 and having disposed between their opposed edges a sealing gasket 23'. Assuming that the device as shown in Figure 1, in which the handle section and suction element 15 are coupled directly to the main stem 1, and provide a tool of any given length, say ten, fifteen, twenty or more feet, and it is desired to extend or increase its length for the purpose of reaching fixtures arranged at a higher elevation, then the stem 1 and tube 7 may be disconnected and one or more extension tube sections, such as 20, may be applied between the same and coupled to the tubes 1 and 7 and to each other, according to the number of sections employed, by means of couplings of the character described. By the use of extension stem sections of this character the length of the tool may be varied within any limit convenient for operation.

In the use of the device for removing a bulb from an elevated fixture, the tool is raised so as to cause the bulb to be properly received in the chamber 3 of the vacuum cup 2 and gripped by the proper gripping surface according to its size. The valve or cock

12, if not open, is then opened and the mouth piece 16 placed in the mouth of the operator, who whereupon exerts a mouth suction action to extract the air from the suction line formed by the tubular conduit between said mouth piece and the cap, thereby forming a vacuum in the cup and causing the cup to tightly grip the bulb, whereupon the cock 12 is closed to maintain the vacuum and the tool then manipulated or rotated by means of its handles 19 to detach the bulb from its socket. The tool is then lowered, and the cock 12 opened to relieve the vacuum, whereupon the bulb may be conveniently extracted from the cup. In applying a bulb to a fixture, the bulb to be applied is fitted in the cup, a vacuum produced in the manner above described so as to hold it gripped, the cock 12 closed to maintain the vacuum, and the tool then elevated and rotated to screw the bulb into the intended socket. By the use of a mouth suction device of the character shown, it has been found that a partial vacuum of a sufficiently high degree to grip a bulb may be easily formed in the vacuum cup and vacuum line, even when the tool is of some considerable length, either by a single suction action or a series of suction actions, between which suction actions the cock 12 may be closed to maintain the degree of vacuum induced on each suction action. The use of such a suction device enables the operator to apply both hands to the handles 19 in handling the tool which affords greater convenience and is oftentimes necessary where the tool is of any considerable length. The tool as thus constructed possesses manifold conveniences and advantages over tools employing mechanical exhaust or suction devices requiring the operator to employ one hand in their actuation, and making it difficult and impossible in many cases for him to hold a long tool in a single hand while this exhaust action is being performed.

For the purpose of affording great convenience of applying to the cup and gripping therein a bulb which is to be applied to a socket, I provide the tool with an auxiliary suction or exhaust device located at some point between the tool handle and the vacuum cup 2 and preferably in more or less close proximity to the latter. This auxiliary suction device comprises a flexible tube 26 having at one end a mouth piece 27 and fitted at its opposite end upon a nipple 28 communicating with the stem 1, which nipple is provided with a valve or cock 29 similar to and having the same function as the valve or cock 12. The use of this auxiliary suction device in proximity to the cup, allows the operator to fit a bulb within the cup and then, by the use of the suction device, to create a sufficient vacuum in the suction line to hold the bulb gripped in the

cup, so as to avoid the necessity of the operator walking a distance to the handle end of the tool for the purpose of using the suction device 15 for the purpose described.

5 This reduces time and labor and possibility of a bulb falling out and becoming damaged where the stem is of some considerable length. If desired, in order that the vacuum producing action of the auxiliary suction device may be accentuated, a cut off valve 30 may be placed in the stem 1 adjacent to the nipple 29 and between the same and the handle end of the stem, which valve may be closed for the purpose of reducing that part of the suction line from which the air is to be exhausted. It will, of course, be understood that when the main suction device 15 is used, the cock 29 is closed, and when the auxiliary suction device 26 is used, the cock 12 is closed. After a bulb is fitted into the cup 2 for application to a fixture, cocks 12 and 29 are kept closed while the tool is raised to apply the bulb and if, during the bulb applying action, the suction grip on the bulb is not sufficient, a greater gripping action may be obtained by further exhaust of air through the action of the suction device 15.

I have found that with this device sufficient suction may be created to draw a bulb very tightly down into the vacuum cup 2. This allows a bulb to be held tight after it has been preliminarily inserted within the socket of a flexible suspension cord or chain, or after it has been gripped for release therefrom, so that the cord or chain may be drawn taut while the bulb is being fully applied or removed, a factor of great importance in applying bulbs to or removing them from a fixture of this character.

From the foregoing description, taken in connection with the drawing, the construction, mode of operation and advantages of my improved bulb manipulator will be readily understood without a further and extended description. While the construction shown is preferred, it is, of course, to be understood that many changes in the form, proportion and arrangement of parts within the scope of the appended claims may be

made without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus fully described my invention, I claim:—

1. A bulb manipulator comprising a tubular stem, a vacuum gripping cup at one end of the stem, a manipulating handle at the opposite end of the stem, and a suction device carried by the handle and communicating therethrough with the stem, said handle and suction device being detachably connected with the stem so as to admit of extension stem sections being applied between the stem and handle.

2. A bulb manipulator comprising a tubular stem, a vacuum gripping cup at one end of the stem, a suction device communicating with the stem at or near the opposite end of the stem, and a suction device communicating with the stem at a point between the first-named suction device and the vacuum gripping cup and in proximity to the latter.

3. A bulb manipulator comprising a tubular stem, a vacuum cup at one end of the stem, a handle at the opposite end of the stem, and suction devices communicating with the stem and arranged, respectively, in proximity to the handle and the cup.

4. A bulb manipulator comprising a tubular stem, a suction device connected therewith, and a vacuum gripping cup carried by the stem and consisting of an elastic body provided with spaced gripping ribs of different diameters.

5. A bulb manipulator comprising a bulb gripping vacuum cup having formed upon its inner wall integral gripping ribs of different diameters, and means for rarefying the air in said cup.

6. A bulb manipulator comprising a bulb gripping vacuum cup having internal gripping ribs located at its free edge and medially of the depth of its chamber, and means for manipulating said cup and for rarefying the air therein.

In testimony whereof I affix my signature.

CLEMENT H. WATKINS.