Sept. 2, 1930. K. A. HUDSON 1,774,652

SPRAYER

Filed June 30, 1927

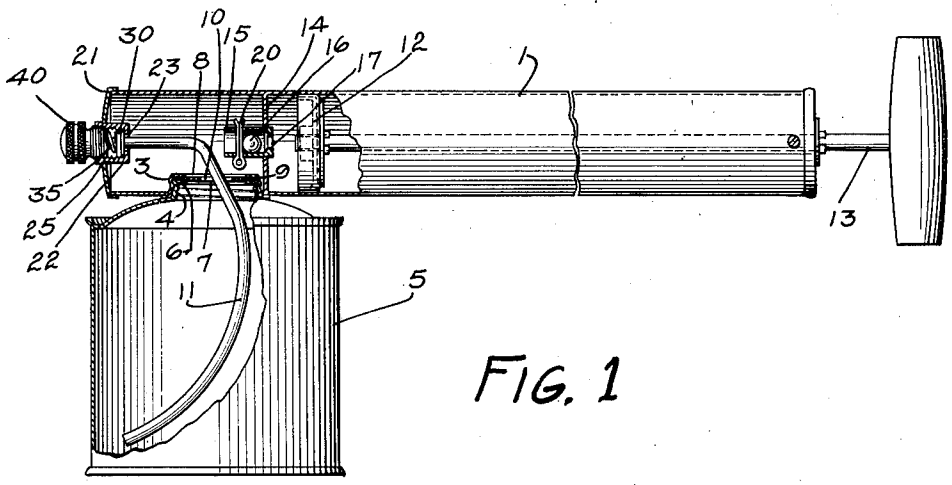


FIG. 1

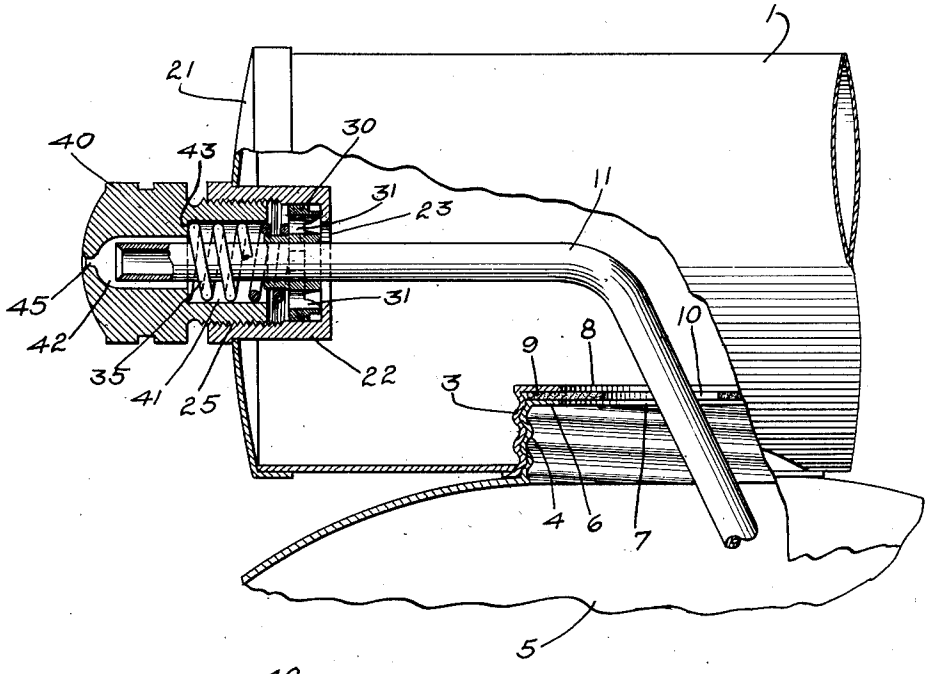


FIG. 2

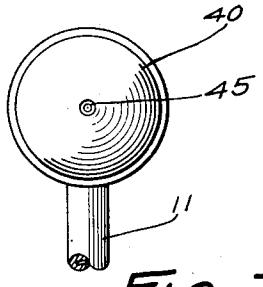


FIG. 3

INVENTOR
KENNETH A. HUDSON
By Parker, Carter & Moore
ATTORNEYS

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UNITED STATES PATENT OFFICE

KENNETH A. HUDSON, OF HASTINGS, MINNESOTA, ASSIGNOR TO HUDSON MANUFACTURING CO., OF MINNEAPOLIS, MINNESOTA, A CORPORATION OF MINNESOTA

SPRAYER

Application filed June 30, 1927. Serial No. 202,593.

This invention relates to improvements in sprayers and includes detachable and adjustable structures, by means of which certain assemblies and adjustments can be quickly and conveniently made.

Broad objects of the invention are to provide a mixing chamber, the capacity of which can be changed by simple adjustment; to provide means for varying the proportions of the air and liquid mixture; and to provide means for varying the form and velocity of the delivered mixture or spray. A specific object is to provide for the adjustment of an element having a spray orifice, relative to a liquid delivery conduit, to change the size of the mixing chamber which is formed between said liquid delivery conduit and said spray orifice. Other objects are to provide means preventing movement of the adjustable element having the spray orifice, after adjustment, but permiting adjustment against the action of the said means; to provide a simple assembly of the parts which includes a spray head, a liquid supply pipe forming with the head a mixing chamber, and an air passage leading to the mixing chamber; and to provide a nozzle having a discharge passage, and arrange an oil delivery tube loosely within the passage to have its discharge end define with the orifice a mixing chamber, adjustment being provided whereby the size of this mixing chamber can be quickly changed, by movement of one of the elements in an axial direction.

Features of the invention include all the details of construction as well as combinations and sub-combinations of the parts.

Features, advantages and objects of the invention will also be set forth in the description of the drawings forming a part of this application and in said drawings:

Figure 1 is a side elevation of the spraying device partly in section;

Figure 2 is an enlarged view of the nozzle and associated parts; and

Figure 3 is an exterior view of the discharge end of the adjustable mixing and spray head.

The number 1 designates a cylinder having an inwardly directed threaded extension 3 cooperating with corresponding threads of a tubular extension 4 of the liquid supply receptacle 5. The extension 4 is provided with an inturned flange 6 forming a perforation 7. An inwardly directed tubular extension 3 is flanged to provide an opening 8. Between the flanges is a washer 9 also having an opening 10 through which the liquid supply and delivery pipe 11 projects from the cylinder into the reservoir 4. The tube 11 is bent so that it can be removed through the end wall of the cylinder 1. A suitable piston head 12 is provided operable by a handled rod 13. A diaphragm 14 divides the cylinder, into forward and rear chambers, this diaphragm being in this instance located adjacent the connecting point between the cylinder and the reservoir. The diaphragm 14 has a tube 15 arranged centrally thereof through which tube the air is discharged from the piston chamber. This tube contains a ball valve 16 adapted to seat to close the opening 17. Outward movement of the ball is limited by means of a cross pin 20.

Mounted in the forward end wall 21 of the cylinder 1 is a socket-like sleeve 22 having an inner end wall provided with an opening 23. The sleeve or socket is interiorly threaded as at 25.

The nozzle as a unit including the oil pipe spray or head, or nozzle, 40, and related parts, are adapted to be conveniently attached or detached from the element 22. Upon the pipe 11 is secured a disk 30 having air openings 31 arranged in opposition to the air opening 23 of the socket 22. This element 30 is immovably fixed to the tube 11 and its inner rim portion abuts the rear wall of the element 22 in which the opening 23 is formed, the openings 31 being arranged to permit free passage of air in a forward direction. Loosely encircling the rod and having its inner coil abutting the element 30 is a compression spring 35 as means, permitting rotative adjustment of the head 40, and yieldably holding the head after adjustment. This element thus acts as a yieldable compression member. This spray head 40 is tubular, and is bored and counter-bored respectively to form rear and forward chambers 41—42 and to pro-

vide a shoulder 43 against which the forward coil of the spring 35 abuts, and frictionally engages. The rear end of the head is reduced and threaded and these threads are engaged with the threads 25 so that when the head is rotated, it is also adjustably translated. A space or chamber is thus formed between the discharge or delivery end of the tube 11 and the forward wall of the bore 42, as well as the discharge of spray orifice 45 in said forward wall. This space forms a mixing chamber at the forward end of the bore 42. It will be evident that the size of this mixing chamber can be varied by adjusting the head 40 in an axial direction against the action of the friction element 35 which, as before stated, positively holds the head in its adjusted position, and yet allows the head 40 to be rotated by the application of a small amount of force. It will be noted that the external diameter of the tube 11 is less than the internal diameter of the bores or chambers 41—42, and that a comparatively narrow annular passage is formed, by the bore wall and the outer wall of the tube 11.

The spring is also arranged to allow passage of air to the mixing chamber.

The tube 11 is so bent that when the threads of the head are disengaged from the element 22, the complete nozzle, including the tube 10, can be removed through the openings 7, 8, 10 and 23.

The element 30 fits the bore of the socket 22 in a manner to support the tube 11, and center the same with respect to the bore of the nozzle. The spring 35 by its expansive action forces the inner face of the perforate centering element 30 against the wall of the socket 22, and thus secures the pipe in operative position. It will be seen that when the head or nozzle 40 is disengaged by unscrewing, the pipe can be quickly removed by withdrawal through the opening 23 of the socket. With this construction, assembly is facilitated and the spray head acts as adjustable means for changing the character of the spray as well as for varying the mixture, and indirectly acts through the compression element 35 to hold the tube in operative position.

Unobstructed outward passage of the air is provided because of the relation of the opening 23 of the socket to the openings 31 of the centering element 30, and also because the spring 35 loosely surrounds the pipe, and further because the outer diameter of the pipe is less than the inner diameter of the bore 42. The member 35 peripherally frictionally engages the bore 41 so that it may be withdrawn with the head or nozzle, and thus may not be so easily detached and lost.

I claim as my invention:

1. In combination with a pump cylinder having an end wall and a passage therein, a nozzle adjustably arranged to control fluid flow through the passage, a tube arranged loosely in the passage and nozzle, said tube and passage being abuttingly engaged in a manner to center the tube and prevent axial movement thereof in one direction, and to permit fluid flow through the passage about the tube, and means abutting tube and nozzle and under compression to secure the tube against axial movement in the opposite direction, and to yieldably secure the nozzle against rotation, and to permit fluid flow around the tube and through the passage and nozzle.

2. In combination with a pump cylinder having an end wall and a passage therein, a nozzle adjustably arranged to control fluid flow through the passage, a tube arranged loosely in the passage and nozzle, said tube having an abutment engaging the passage in a manner to center and prevent axial movement of the tube in one direction, and to permit fluid flow through the passage about the tube, and means under compression between the abutment and nozzle to secure the tube against axial movement in the opposite direction, and to yieldably secure the nozzle against rotation, said means being arranged to permit fluid flow around the tube and through the passage and nozzle.

3. In combination a cylinder having an end wall and a socket therein opening outwardly and having an opening in its inner wall, a tube traversing the cylinder and extending forwardly through the opening into the socket, a perforate element secured to the tube and arranged within the socket and abuttingly engaging the end wall thereof, a nozzle having threaded engagement with the socket and extending outwardly beyond the end of the tube and surrounding the same to provide an annular passage said nozzle having a shoulder on the inside thereof, the outer end of the tube being spaced from the discharge orifice of the nozzle to form a mixing chamber, and a coil spring loosely surrounding the pipe and compressively arranged between and abutting the nozzle shoulder and the perforate element.

4. A cylinder having a socket in its wall having an opening, a nozzle adjustably engaged with the socket, a tube loosely entering the opening, socket and nozzle, and having a perforate abutment engaging the wall of the socket, and a resilient element engaging the abutment of the tube and the nozzle, under compression, to secure the tube against translation, and yieldably secure the nozzle against adjustment.

5. A pump cylinder having a socket in its end wall having an opening, a nozzle connected with the socket for adjustment, a tube loosely entering the opening, socket and nozzle, said tube having a perforate centering abutment engaging the socket wall to prevent translation of the tube towards the cylinder, and a spring surrounding the tube and

respectively engaging the abutment and nozzle in a manner to frictionally yieldably hold the nozzzle against rotation, and hold the tube against translation.

6. In combination with a cylinder having a socket communicating therewith, a nozzle adjustably connected with the socket, a pipe leading from the cylinder outwardly loosely through the socket and loosely into the nozzle, said pipe having a perforate abutment engaging with the wall of the socket at point of communication between the socket and the cylinder in a manner to center the tube, and maintain communication between the cylinder socket and nozzle, and a resilient element loosely surrounding the tube and engaging the tube abutment and nozzle and acting to hold the tube abutment against the socket wall, permit yielding frictional adjustment of the nozzle and allow fluid flow between it and said pipe.

7. In combination with a cylinder having a socket in communication therewith, a nozzle having threaded engagement with the socket, a pipe leading from the cylinder outwardly loosely through the socket and into the nozzle in a manner to permit circulation of fluid therethrough, said pipe having a perforate abutment engaging the wall of the socket adjacent its point of communication with the cylinder, and an element under compression between the tube abutment and the nozzle in a manner to hold the abutment against movement and frictionally engage the nozzle to prevent accidental rotation but permit yielding adjustment.

8. In combination with a cylinder having a socket in communication therewith, a nozzle connected with the socket to be adjusted axially as the result of rotation, a pipe leading from the cylinder outwardly loosely through the socket and into the nozzle and having a perforate abutment engaging the socket wall adjacent its point of communication and cylinder to center the pipe, and a resilient element abuttingly engaging the tube abutment, and nozzle under compression to hold the abutment against the socket wall and to prevent accidental rotation of the nozzle but to permit yielding adjustment thereof, the arrangement being such that a passage for fluid outwardly through the nozzle is maintained, the arrangement further being such that said tube is removable by withdrawal through the socket after removal of the nozzle.

9. In combination with a cylinder having a socket in communication therewith, a nozzle connected with a socket to be adjusted axially as the result of rotation, a pipe leading from the cylinder outwardly loosely through the socket and into the nozzle and having a perforate abutment engaging the socket wall adjacent its point of communication with the cylinder, and a resilient element abuttingly engaging the tube abutment and nozzle under compression to hold the abutment against the socket wall and to prevent accidental rotation of the nozzle but permit yielding adjustment thereof, the arrangement being such that a passage for fluid outwardly through the nozzle is maintained, and said resilient means being engaged with the nozzle in such manner as to be removable therewith, independently of the tube.

In witness whereof, I have hereunto set my hand this 25th day of June, 1927.

KENNETH A. HUDSON.