

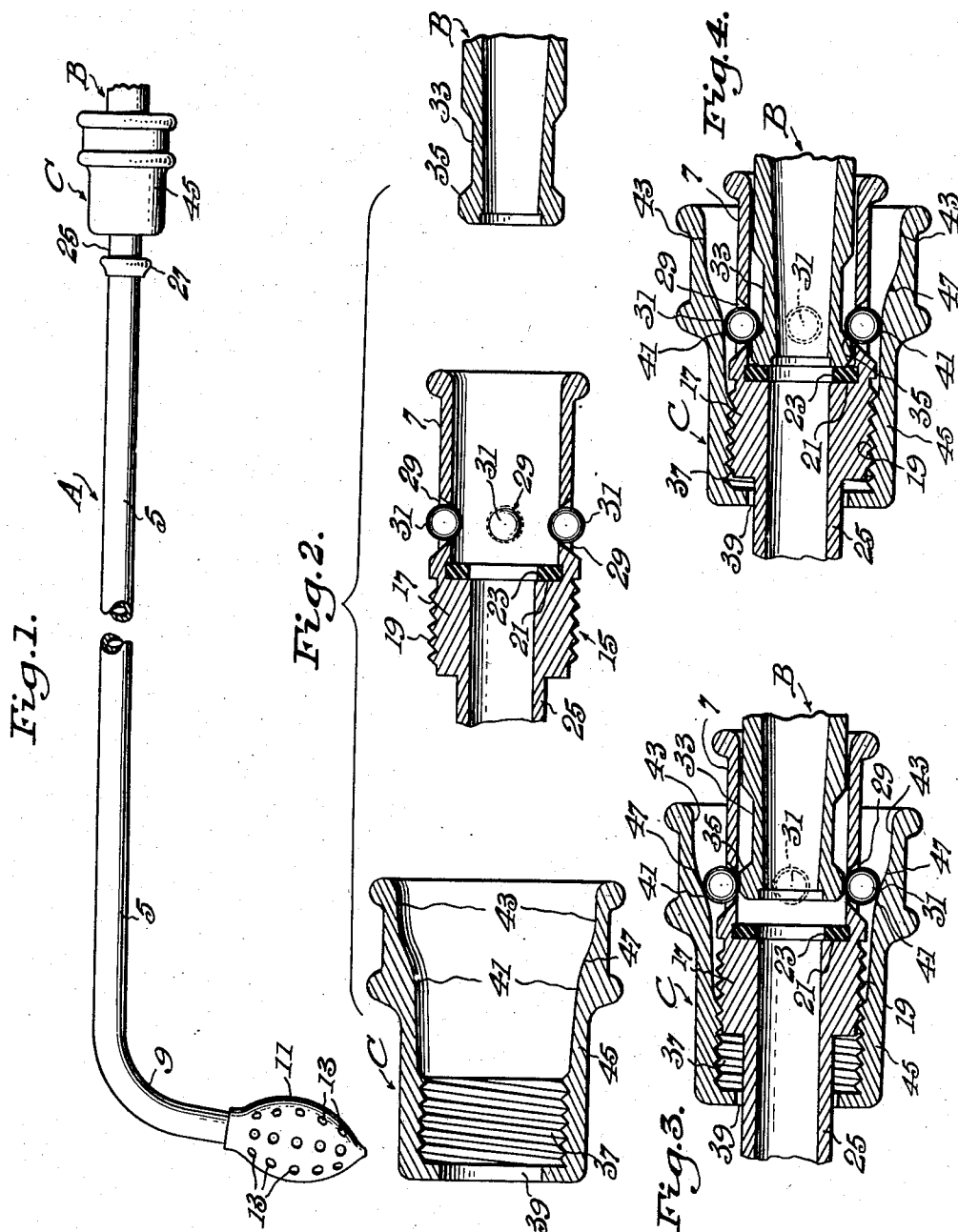
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NOZZLE ASSEMBLY FOR FIRE-FIGHTING EQUIPMENT

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NOZZLE ASSEMBLY FOR FIRE-FIGHTING EQUIPMENT

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Original application March 31, 1948, Serial No. 18,123, now Patent No. 2,567,176, dated September 11, 1951. Divided and this application August 14, 1951, Serial No. 241,875

5 Claims. (Cl. 299—111)

(Granted under Title 35, U. S. Code (1952), sec. 266)

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The invention described herein may be manufactured and used by or for the Government for governmental purposes, without payment to me of any royalty thereon.

The present invention provides certain improvements in fire-fighting equipment, and more specifically it provides for an attachment for a nozzle of a fire hose for facilitating application of fire-extinguishing media, either in liquid form, such as water or chemical extinguishing agents, or in gaseous form, such as carbon dioxide, onto fires located in difficultly accessible locations.

The invention has for a more specific object the provision of an improved construction of a detachable nozzle attachment which will deliver to a fire a selected type of stream of extinguishing medium dependent upon the particular environment in which the fire is located, as well as the type of material undergoing combustion.

The present application is a division of the copending application Serial No. 18,123, filed March 31, 1948, now Patent No. 2,567,176, entitled "Fire Fighting Nozzle."

The nozzle attachment of the present invention will be understood structurally from a consideration of the accompanying drawings, in which:

Fig. 1 represents a fragmentary side elevation of the improved attachment mounted on the end of a fire-fighting nozzle;

Fig. 2 is an exploded longitudinal sectional view showing coupling means for attaching the adapter of Fig. 1 to the end of a nozzle;

Fig. 3 is a fragmentary detail longitudinal sectional view of a portion of a nozzle tip with an applicator being applied thereto; and

Fig. 4 is a fragmentary detail longitudinal sectional view, showing the parts of Fig. 3 in an assembled relation with the applicator attachment in operative position on the nozzle tip.

Referring more particularly to the drawings, reference character A designates generally the improved applicator attachment which is adapted to be connected to a fire hose nozzle B.

The applicator attachment A comprises a tubular stem 5 having its intake end secured to the nozzle B through connector means 7, which will be referred to in greater detail hereinafter. The stem 5 is shown as having a bend 9 therein, adjacent to the discharge head 11, which bend is shown as being approximately a 90° bend, although this is not essentially a critical factor; but this bend frequently facilitates insertion of the discharge head 11 into a location of a difficultly accessible fire. The discharge head 11

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is shown as having a plurality of discharge openings 13 for spraying extinguishing liquid onto the fire, or for forming an incombustible blanket of extinguishing medium around a fire. The discharge head 11 is removable readily for replacement with other interchangeable heads for producing various selected patterns of extinguishing liquid depending upon the character and location of the fire being fought.

The connection of the applicator attachment A to the nozzle B is made by means of the cylindrical tubular connector 7, which has a forwardly extending end portion 15 having an annular collar 17 that is externally threaded, as shown at 19, and defines an internal annular abutment shoulder 21 for seating a resilient washer 23 against which the end of the nozzle B may be received. The collar 17 is extended forwardly in a tubular portion 25 to which is attached the stem 5 of the applicator A through a connecting collar 27.

For connecting the tubular applicator A to the nozzle B, the connector 7 is provided with a series of annularly disposed holes 29 which taper inwardly, and which receive metallic locking balls 31. These balls are proportioned in their diameter relative to the holes 29 so that they will pass into these holes 29 and are retained therein for interlocking in an annular recess 33, provided for the reception of the said balls 31 in the nozzle B, the tip 35 of the said nozzle seating against the washer 23, this tip 35 of the nozzle also forming a locking abutment for the nozzle in conjunction with the balls 31 as will be apparent from the drawings.

The forward portion of the connector 7, including the threads 19 on the collar 17 extends into a locking sleeve C, this latter element being tubular and cylindrical, and is provided with internal threads 37 which mesh with the threads 19 on the connector 7, the forward end of the locking sleeve C being open as indicated at 39 for the passage of the forward tubular extension 25 of the connector 7. The rear end of this locking sleeve C is slightly divergingly tapered inside, as shown at 41 and 43, for clearing the locking balls 31 while retaining the latter in the countersunk holes 29.

In assembling the attachment, the metal locking balls 31 are placed in the countersunk holes 29. The cylindrical casing 45 of the locking sleeve C is slipped over the connector 7 and the threads 37 and 19 are engaged, and interlocked. At this position, the metal balls 31 are free to move in and out of the countersunk holes 29, but they can-

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not be entirely displaced therefrom, since there is insufficient clearance between the outside of the connector 7 and the inside of the sleeve, and since the minimum diameter of the holes 29 is less than the diameter of the metal balls 31.

The assembled attachment can be slipped over the nozzle tip, since the inside diameter 43 is such that the balls 31 can be pushed outwardly by cam action of the nozzle tip 35 as it enters the connector 7.

Then as the sleeve 45 is screwed further onto the connector in the direction of the nozzle tip, the convergingly tapered surface 47 of the sleeve engages the balls 31 and depresses the balls in their countersunk holes 29 until they extend into the annular recess 33 in the nozzle tip and against the tapered cam surface 47, forcing the nozzle tip tightly against the washer 23 to prevent leakage. The tubular projection 25 usually is a part of the applicator stem 5, although it may be threadedly connected thereto by means of a collar 27 which is mounted on the applicator stem 5 and serves as a stop for preventing accidental displacement of the connector sleeve C from the connector 7, thereby preventing possible loss of the balls 31. The sleeve C may be slipped over the tubular applicator stem 5 prior to bending thereof and attachment of the spray head 11, and also prior to application of the stop 27, which may be welded or secured otherwise to the tubular applicator stem 5. If this stop-collar 27 serves as a connector between the applicator stem 5 and the projection 25, it may be threaded internally and complementarily to threads on the end of the projection 25, this being a mere matter of detail determined purely by considerations of convenience of manipulation as will be obvious.

Also it will be apparent that the applicator unit herein described is replaceable readily with other units of similar construction but of different lengths, for example by way of illustration, six, eight, ten, or twelve feet, depending on conditions of use.

Having thus described my invention, what I claim as new and wish to secure by Letters Patent is:

1. A nozzle assembly adapted to direct fire-extinguishing fluid to a mass of flaming combustibles which comprises, in combination, a nozzle having a barrel provided with a discharge end and having a conduit therethrough for passage of fire-extinguishing fluid through the barrel, the said discharge end of the barrel having an annular cam-shaped surface, the barrel also having a restricted exterior channel adjacent to but spaced behind the discharge end, an extension for the nozzle comprising a tubular stem defining a fluid passage therethrough, the said stem having a forward end and a rear end adapted to be received over the barrel of the nozzle, the said stem having a substantially thickened wall section intermediate the said ends, external threads on the said thickened wall surface, the fluid passage in the stem rearwardly of the thickened wall section being of substantially greater diameter than the fluid passage in the said thickened wall section and in advance thereof and defining with the thickened wall section a rear annular abutment recess, a resilient sealing gasket in the said recess for receiving in abutting relation thereagainst the discharge end of the said nozzle barrel, a plurality of openings in the stem extending through the wall thereof and opening into the enlarged portion of the fluid

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passage, the said openings being disposed concentrically around the stem and rearwardly of the sealing gasket, the said openings having inwardly converging sides so that the diameter of the openings at the enlarged fluid passage is substantially smaller than the diameter of the openings at the outer surface of stem, spherical locking members freely positioned in the said openings, the locking members having a diameter greater than the least diameter of the openings so that the locking members are prevented from passing entirely through the openings while partially projecting therethrough for engagement with the cam end surface of the nozzle as the nozzle becomes connected to the stem, the said cam end surface of the nozzle pressing the locking members outwardly relative to the openings responsively to insertion of the nozzle-barrel into the stem until the locking members ride over the cam end surface of the nozzle-barrel and drop into the channel on the nozzle-barrel responsively to full insertion of the barrel into the stem until the discharge end of the barrel abuts against the resilient seal in the stem, and an outer locking sleeve on the stem having a forward end and a rear end, the said locking sleeve having a tubular passage therethrough for receiving the stem and interfitting therewith, the passage being threaded interiorly along a portion of its length adjacent to the forward end of the sleeve, the said threads being complementary to and intermeshing with the threads on the thickened wall section of the stem for securing the locking sleeve on the stem, the said passage in the locking sleeve flaring outwardly in diameter as it approaches the rear end of the sleeve and defining a cam surface in the sleeve forwardly of the rear end of the sleeve, the said cam surface engaging the spherical locking members responsively to full insertion of the nozzle-barrel and adjustment of the sleeve rearwardly on the threads of the stem for pressing the said locking members into tight locking engagement with the channel in the nozzle-barrel for securing the nozzle-barrel and stem in tightly interlocked relation, the length of the threaded portion of the sleeve being greater than the length of the threaded portion of the stem so that a forward screwing movement of the sleeve on the stem will advance the sleeve relative to the stem until the cam surface within the sleeve becomes disengaged from locking engagement with the spherical locking members, thereby releasing the locking members from locking engagement with the channel in the nozzle-barrel and the flaring diameter of the passage in the sleeve forms a clearance for the locking members sufficient to release the locking members from locking engagement with the channel while the sleeve still retains the locking members in their openings, the release of the locking members enabling withdrawal of the nozzle-barrel from the stem, the said sleeve also defining a forward clearance with the stem for enabling requisite adjustments of the sleeve relative to the stem.

2. A nozzle assembly adapted to direct fire-extinguishing fluid to a mass of flaming combustibles, which comprises, in combination, a nozzle having a barrel provided with a discharge end and having a conduit therethrough for passage of fire-extinguishing fluid through the barrel, the said discharge end of the barrel having an annular cam-shaped surface, the barrel also having an exterior channel adjacent to but

spaced behind the discharge end, an extension for the nozzle comprising a tubular stem defining a fluid passage therethrough, the said stem having a forward end and a rear end adapted to be received over the barrel of the nozzle, the said stem having a substantially thickened wall section intermediate the said ends, external threads on the said thickened wall surface, the fluid passage of the stem rearwardly of the thickened wall section being of substantially greater diameter than portions of the passage in advance of the thickened wall section and defining with the thickened wall section a rear annular abutment recess, a resilient sealing gasket in the said recess for receiving in abutting relation thereagainst the discharge end of the nozzle, the said stem being provided with a plurality of openings extending through a section of the wall of the stem rearwardly of the said thickened wall section and opening into the enlarged portion of the fluid passage, the said openings being disposed concentrically around the stem and rearwardly of the sealing gasket, the said openings having inwardly converging sides so that the diameter of the openings at the enlarged fluid passage in the stem is substantially smaller than the diameter of the openings at the outer surface of the stem, spherical locking members loosely positioned in the said openings, the locking members having a diameter greater than the least diameter of the openings so that the locking members are prevented from passing through the openings, which having a portion of the locking members projecting through the openings for engagement with the cam end surface of the nozzle which presses the locking members outwardly relative to the openings responsively to insertion of the nozzle-barrel into the said stem until the said locking members ride over the said cam end surface of the nozzle and drop into the said channel on the nozzle-barrel responsively to full insertion of the barrel into the stem until the discharge end of the barrel abuts against the resilient seal in the stem, an outer locking sleeve on the said stem having a forward end and a rear end, the said locking sleeve having a tubular passage therethrough for receiving the said stem and interfitting therewith, the said passage being threaded interiorly along a portion of its length adjacent to the forward end of the sleeve, the said threads being complementary to and intermeshing with the threads on the thickened wall section of the stem for securing the said locking sleeve on the stem, the said passage in the locking sleeve flaring in diameter as it approaches the rear end of the sleeve and defining a cam surface in the sleeve forwardly of the rear end of the sleeve, the said cam surface engaging the spherical locking members on the stem responsively to full insertion of the nozzle-barrel into the stem and adjustment of the sleeve rearwardly on the threads of the stem for pressing the said locking members into tight locking engagement with the recess in the nozzle-barrel for securing the nozzle-barrel and stem in tightly interlocked relation, the length of the threaded portion of the sleeve being greater than the length of the threaded portion of the stem so that a forward screwing movement of the sleeve on the stem will advance the sleeve relative to the stem until the cam surface within the sleeve becomes disengaged from locking engagement with the said spherical locking members, thereby releasing the locking members from locking engagement with

the channel in the nozzle-barrel and the flaring diameter of the passage in the sleeve forming a clearance for the locking members sufficient to release the locking members from their locking engagement with the channel while still retaining the locking members in their openings, the release of the locking members enabling withdrawal of the nozzle-barrel from the stem, the said sleeve also defining a forward clearance with the stem for enabling requisite adjustments of the sleeve relative to the stem, and a stop member mounted on the stem and spaced forwardly of the sleeve but adapted to be engaged by the sleeve at the end of forward movement of the sleeve relative to the stem for preventing complete disengagement of the threads in the sleeve from the threads on the stem.

3. The construction of claim 1 wherein the complementary threads on the stem and in the locking sleeve define means for permanently attaching the locking sleeve to the stem, the said locking sleeve being substantially longer than the stem so that the locking spheres mounted in the stem are covered continuously by the sleeve and are thereby prevented from becoming displaced from their openings in all positions of relative adjustment between the sleeve and the stem.

4. The construction of claim 2 wherein the stop member is positioned relative to the sleeve so that the sleeve is prevented from complete separation from the threads of the stem in all positions of relative movement or adjustment between the sleeve and stem.

5. The construction of claim 2 wherein the forward end of the sleeve is provided with an annular closure flange having a centrally disposed opening therethrough defining the forward end of the passage in the sleeve, the flange abutting against the stop member on the sleeve for limiting forward movement of the sleeve on the threads of the thickened wall portion of the stem prior to complete disengagement of the threads in the sleeve from the threads on the thickened wall portion of the stem, the opening through the closure flange defining a clearance between the flange and stem for enabling unimpeded adjustments of the sleeve relative to the stem between limits of movements of the sleeve on the thickened wall portion of the stem and a forward abutment shoulder on the said thickened wall portion of the stem defining an abutment stop against which the closure flange of the sleeve engages for limiting rear movement of the sleeve relative to the stem, the said rear movement of the sleeve being stopped by engagement of the closure flange against the said forward abutment shoulder on the thickened wall portion of the stem at which engagement the cam surface in the sleeve is in locking contact with the spherical locking members.

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