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(54) **Spray tip with improved turret seal.**

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US-A-4 116 386

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Description

This invention relates to a spray tip for airless spraying according to the preamble of claim 1, and, in particular, to such a spray tip provided with a reversible and interchangeable turret member.

In US-A-3,831,862, a spray tip assembly is disclosed in which the spray tip orifice is mounted in a removable and reversible sleeve which is secured in the housing with a sliding pin interlock that seats against a spring biased seal. This construction requires loosening of the body from its adapter to reverse and/or replace the spray tip orifice.

In US-A-4,116,386, which forms the preamble of claim 1, a spray tip assembly is disclosed in which the spray tip orifice is mounted in a cylindrical turret member which can be rotated in the housing to reverse the orifice member for cleaning. This construction employs a solid, resilient plastic seal which has a concave, cylindrical sealing surface. US-A-3,202,360 also discloses an airless spray tip having a rotatable turret member, which is sealed with a packing sleeve and nut.

US-A-4,165,836 discloses that plastic seals experience excessive wear and suggests that an entirely metal seal be used to provide metal-to-metal contact with the turret member. Experience with devices of this invention, however, reveals that a metal seal is not effective with low viscosity liquids, which leak from the assembly under the high pressures used in airless spraying.

In US-A-4,484,707 and 4,483,481, a metal-backed, thin plastic seal is disclosed which is secured in the housing against dislodgement even when the turret member is removed, as when interchanging the turret members to obtain a different sized spray orifice.

While a very thin plastic seal such as disclosed in my parent application provides significant improvement over previous seals in that it permits use of the spray tip with low viscosity liquids without leaking and reduces the tendency of the turret member to seize, further improvements, particularly in longevity of the seal are desirable. In particular, it is desirable to employ a solid plastic seal of significant thickness for sustained use and to provide a simple and inexpensive construction.

This is achieved by the features of claim 1.

The invention as claimed provides a spray tip useful for high pressure, airless spraying which utilizes a turret member which contains an orifice tip. The turret member is rotationally mounted in the spray tip housing so that it is reversible and is interchangeable with other holders supporting orifice tips of varied diameters and capacities. In particular, the spray tip member uses a seal subassembly which is received in the longitudinal through passageway of the housing, and this subassembly includes a seal formed entirely of a reinforced plastic. A very hard plastic such as an acetal copolymer is used and, preferably, this plastic is reinforced with glass fibers. The seal is mounted on one end of a piston that is slidably received in the through bore of the adapter, and is resiliently biased to compress the seal against the turret member. On its opposite end, the piston is engaged by a compression spring that is captured between the upstream end of the piston and the end face of the barrel of the spray gun on which the spray tip is mounted, to provide the resilient bias for sealing the turret member.

The spray tip of this invention provides very superior performance over all other spray tips. The seal is indexed and restrained against rotation and dislodgement when the turret member is removed, thereby facilitating replacement of the turret member. The seal is very effective, even with very low viscosity liquids and effectively seals the turret member against all leakage of the spray liquid. The spring biasing the seal subassembly provides a number of advantages. When the tip is placed on a spray gun, the retainer nut can be hand tightened to compress the spring sufficiently to restrain the turret member from falling out of the tip, thus freeing one's hand to apply a wrench for final tightening of the retainer nut and to rotate the tip to the desired alignment on the spray gun. When the retainer nut is tightened sufficiently to prevent leaking under pressure, the spring still provides sufficient resilient bias on the seal to maintain a dynamic seal which freely permits one to rotate the turret member between its cleaning and spraying positions with finger pressure and without releasing the tension on the retainer nut.

One way of carrying out the invention is described in detail below with reference to the drawings which illustrate a preferred embodiment, in which:

FIGURE 1 is a side elevational view of the spray tip;

FIGURE 2 is a top view of the spray tip;

FIGURE 3 is a perspective view of the spray tip housing body;

FIGURE 4 is a partial sectional elevational view of the spray tip;

FIGURE 5 is an exploded perspective view of the housing body and adapter subassembly;

FIGURE 6 is an exploded perspective view of the seal subassembly; and

FIGURE 7 is an exploded perspective view of an alternative seal subassembly.

Referring now to FIGURES 1 and 2, the invention is shown with a spray guard 10 mounted on a housing body 12 which supports a turret member 14. The turret member has a dependent handle 16 on shaft 18 which extends to a cylindrical turret member described in detail hereinafter. The spray guard body 26 has an aperture 28 which receives the turret member 14. The turret member 14 has a radial prong 20 and aperture 28 in spray guard 10 has a notch 32 which permits extraction of the turret member when the latter is rotated to align prong 20 beneath notch 32.

The body 12 is also shown in FIGURE 3 with the turret member 14 and spray guard 10 removed. As shown in FIGURE 3, body 12 of the spray tip

housing has a longitudinal chamber 46 of non-circular, preferably rectangular, cross-section. The end wall 48 is bored to provide the central aperture 15. The housing body 12 also has a cylindrical bore 30 orthogonal to and intersecting the longitudinal chamber 46 and this cylindrical bore 30 receives the cylindrical turret member 14. The top wall 17 of the body 12 has a raised annular shoulder 19 and abutment stops 22 and 24 at its opposite edges. As shown in FIGURE 2, these abutment stops serve as limiting stops for the rotation of the turret member, engaging prong 20 and permitting rotation of the turret member through 180 degrees of rotation. These rotation limiting stops are engaged when the turret member is in either its cleaning or spraying positions.

As shown in FIGURES 1 and 2, the spray guard 10 has a square cross-sectional body 26 with a central cavity 38 that fits over the rectangular body 12 of the spray tip. The spray guard 10 has a pair of outwardly diverging wings 40 and 42 which are generally trapezoidal. At the apex or intersection of wings 40 and 42, the spray guard has a slot 44 to provide clearance for the spray discharged from the spray tip. Each of the outwardly diverging wings 40 and 42 has a longitudinal, central, through slot such as 41. As illustrated for the preferred embodiment, the slots are narrow and extend substantially the entire length of wings 40 and 42.

The spray tip assembly is retained on the externally threaded barrel 21 of a spray gun by the retainer cap nut 34. Tightening of this nut on the threaded barrel of the spray gun axially compresses the internal seals of assembly in the manner described in greater detail hereinafter. For this purpose, lugs 36 can be provided to permit hand tightening of cap nut 34.

Referring now to FIGURE 4, the spray tip assembly is shown in greater detail, removed from barrel 21 of the spray gun. The turret member 14 is received in bore 30 of the housing body 12 and extends across the longitudinal chamber 46. The turret member carries a spray tip orifice member 56 in a transverse bore 52. The housing body 12 is assembled to a housing adapter 58 to form a housing subassembly, which is shown in exploded view by FIGURE 5. The adapter 58 has a through bore 63 and a threaded end 57 and an annular shoulder 61. Adapter 58 has an end flange 60 that is received within the retainer nut 34, and a low frictional characteristic, bearing washer 62 is captured between the annular rim 64 (see FIGURE 4) of retainer nut 34 and flange 60 of adapter 58 and provides very low frictional resistance between the retainer nut 34 and the assembly of body 12 and adapter 58, when the retainer nut 34 is tightened. The housing subassembly is permanently secured by threading adapter 58 into internally threaded bore 50 in body 12. For this purpose, wrench flats 65 are formed on the internal end wall of bore 63 of adapter 58. The bore 50 also has a square shoulder, i.e., is unchamfered, to provide an abutment stop which precisely controls the axial positioning of adapter 58 provides the inlet port to the housing body 12, and this passage 63 receives the seal subassembly, which is also illustrated in FIGURE 4, and in an exploded view by FIGURE 6.

The seal subassembly (see FIGURE 6) comprises a piston 76 with a through bore 77 which aligns with a central through bore 87 in seal 88. The seal 88 has a square face 89, to fit the square cross-sectional chamber 46 of body 12. The rear face of seal 88 has a boss 90 and a reduced diameter neck 92 which is received in a counterbore 74 of piston 76. This construction secures the subassembly during use of the spray tip, since the fluid pressure in the central seal subassembly, will compress the neck 92 of the plastic seal tightly against the counterbore 74 of piston 76. Piston 76 has an annular groove 75 which receives a sealing washer, e.g., an O-ring 80 (see FIGURE 4) to seal the piston in the central passage 63 of adapter 58. The upstream end of piston 76 has a reduced diameter neck 78 and a compression spring 66 is received over this neck.

The assembly of the spray tip on a spray gun and tightening of the retainer cap nut 34 on the threaded barrel 21 (see FIGURE 1) of the spray gun applies an axial compression to the seal assembly. The compression spring 66 bears against the end of the spray gun barrel and applies a resilient force to the piston 76, ensuring that a constant loading is applied to the seal 88, regardless of the tension applied to the retainer nut 34. A seal washer 69 is retained between the end of the spray gun barrel and the inside face of flange 60 of adapter 58.

Referring now to FIGURE 4, the turret member 14 has a transverse bore 52 which is counterbored at 54 to receive spray tip orifice member 56. The orifice member 56 is firmly seated against the annular shoulder between bore 54 and counterbore 56. Bore 52 should be of sufficient length that the orifice tip 56 does not project beyond the cylindrical surface of turret member 14. The orifice member 56 is retained in the assembly by sleeve 55 which is pressed into the counterbore 54 and a sealing washer 57 is compressed against the orifice member 56 to seal this member in the counterbore 56.

Referring now to FIGURE 7, an alternative construction for the seal subassembly is shown. The seal 88 is substantially the same as previously described with a square face 89 to fit in the chamber 46 of housing body 12. The rear face of seal 88 has a boss 90 which has an enlarged counterbore 93. The piston 76 has a reduced diameter neck 79 on its downstream end and this neck fits into the counterbore 93 of the seal 88. The remainder of the seal subassembly is the same as previously described with reference to FIGURE 6, with annular groove 75 which receives and O-ring 80 to seal the piston in the central passage 57 of adapter 58 and a reduced diameter neck 78 on its upstream end to receive compression spring 66, previously described.

The seal is formed entirely of plastic, which is

filled with from 5 to 50, preferably from 15 to about 30, weight percent of a reinforcement filler. Various plastics can be used for this purpose, including acetal homopolymer and copolymer, polysulfones, polyphenylene sulfide, polycarbonate, thermosetting and thermoplastic polyimdes, Nylon, poly(amide-imide), etc. Acetal copolymer is preferred for its hardness and wear resistance. Typically, acetal copolymers have Rockwell hardness values from M78 to M80 by the ASTM D785 test. The acetal copolymer is prepared by the copolymerization of trioxane with slight amounts of a comonomer which provides carbon to carbon bonding in the polymer chain, thereby imparting a high degree of thermal stability to the polymer. The polymer has a very high creep resistance and a tensile strength in excess of 1054 kilograms per square centimeter.

The fillers which can be used for reinforcement of the plastic seal body include graphite, silica, alumina powders, and fibrous reinforcements such as graphite and glass fibers. Preferably, glass fibers having lengths from about 0.23 to about 0.63 centimeters are used.

The spray tip of this invention is provided with a plurality of interchangeable turret members with varied sizes of orifice tips to permit the user to switch turret members whenever it is desired to change the volume or spread of the fan spray. The orifice tips can be provided in sizes from about 0.023 to about 0.19 centimeter in any varied increments, preferably in increments from about 0.003 to 0.008 centimeter. These orifice tips will provide a fan spray with a width from 5 to about 55 centimeters in approximately 5 centimeter increments.

Because the seal and seal support are indexed in the tip housing 12 against rotation, the cylindrically concave face 89 of the seal remains in axial alignment with the cylindrical bore 309 when the turret member is removed or replaced. Also, since the seal support 76 is restrained by its frictional fit with the piston 76, it can not fall out of position when the turret member is removed. Instead, it resists dislodgement and remains in place to ensure that the turret member, or a replacement turret member, can be quickly inserted without need to reposition the seal support.

The invention provides a number of definite advantages over prior spray tips. The plastic seal of the invention tightly seals and minimizes leakage even with low viscosity liquids. The rigid seal support firmly supports the seal, and the compression spring ensures that the seal does not seize the turret member and prevent its rotation by hand, even when the spray tip has been mounted on the spray gun for a prolonged period. The turret member can be quickly reversed to its clean-out position, any obstructions can be sprayed out of the orifice, and the turret member can be returned to its spraying position, all without loosening the retainer nut. The turret member is easily removable from the spray tip simply by loosening retainer cap nut 30 and rotating the turret member to align its prong with the notch of the spray guard. When the turret member is removed, the seal and seal support remain in place to permit rapid replacement of the turret member. The retainer cap nut can be tightened and loosened by hand and the spray tip can be rotated on the spray gun without loosening the cap nut.

Claims

1. A spray tip comprising a body subassembly (12) comprising a housing having a longitudinal chamber (46) and an intersecting orthogonal cylindrical bore (30) and adapter means (34) for attachment of said body assembly to a spray gun (21) including a central inlet passage (50) to said housing; a cylindrical turret member (14) rotatably seated in said intersecting cylindrical bore (30) and having a transverse bore (52) in alignment with said longitudinal chamber (46); a spray tip orifice member (56) rotatably mounted in said transverse bore (52); a turret member seal (88) received in said longitudinal chamber (46) and having a central through passage-way (87) and a cylindrical concave seal surface (89) facing said turret member (14); characterized in that:

(a) said turret member seal (88) is formed of a hard reinforced plastic material, such as an acetal polymer;

(b) a seal piston (76) is received in said central inlet passage (50) and extends into abutting engagement with the rear face of said turret member seal (88) and has a central through passageway (77) aligned with the central through passage-way (87) of said turret member seal; and

(c) resilient means (66) bias said piston (76) against said turret member seal (88).

2. The spray tip of Claim 1, characterized in that said plastics material is filled with from 5 to 45 weight percent reinforcement material.

3. The spray tip of Claim 2 further characterized in that said reinforcement material is fiber glass and is present in an amount from 10 to about 30 weight percent.

4. The spray tip of Claim 1, 2 or 3, characterized in that said plastics material is an acetal copolymer.

5. The spray tip of any one of Claims 1 to 4, characterized in that said resilient means is a compression spring (66) and the upstream face of said seal piston (76) has a reduced diameter portion (78) received within the downstream end of said spring (66), to serve as a spring retainer.

6. The spray tip of any one of Claims 1 to 5, characterized in that said turret member seal (88) and seal piston (76) form a seal sub-assembly with cooperative interlocking means (90, 92, 74) on the downstream face of said piston and the upstream face of said turret member seal.

7. The spray tip of Claim 6, further characterized in that said interlocking means comprises

a reduced diameter sealing portion (79) on the downstream face of said piston (76) and a central counterbore (93) in the upstream face of said turret member seal (88) to receive said sealing portion in a pressed fit.

8. The spray tip of Claim 7, further characterized by the provision of a seal washer (80) on said sealing portion (79) between said piston and seal.

9. The spray tip of Claim 6, further characterized in that said interlocking means comprises a reduced diameter portion (79) on the downstream face of said piston (76) and a central counterbore (93) on the upstream face of said turret member seal (88) to receive said reduced diameter portion (79) in a pressed fit.

10. The spray tip of Claim 9, further characterized by the provision of a seal washer (80) on said piston (76), between said piston and said turret member seal.

11. The spray tip of Claim 1, characterized in that an annular groove (75) is formed about said piston (76) and an O-ring (80) is seated in said groove, to seal said piston in the central inlet passage (50) of said tip housing.

12. The spray tip of any one of Claims 1 to 11, characterized in that said adapter means (34) is a flanged connector sleeve (58) which is threadably received in the rear wall of said spray tip housing (12) and including a retainer cap nut (34) received over the upstream end of said sleeve with a low friction, bearing washer (62) captured between an annular rim (64) of said cap nut (34) and flange (60) of the connector sleeve (58).

Patentansprüche

1. Ein Sprühkopf, enthaltend eine Gehäuse-Baugruppe (12), enthaltend ein Gehäuse mit einer Längskammer (46) und eine rechtwinklig schneidende zylindrische Bohrung (30) und Anschlußeinrichtungen (34) zum Befestigen der genannten Gehäuse-Baugruppe an eine Spritzpistole (21) mit einer mittleren Einlaßöffnung (50) für das Gehäuse; ein zylindrisches Drehkopfteil (14), das drehbar in der schneidenden zylindrischen Bohrung (30) sitzt und eine Querbohrung (52) aufweist, die zu der genannten Längskammer (46) ausgerichtet ist; ein Sprühkopf-Düsenteil (56), das drehbar in der genannten Querbohrung (52) befestigt ist; einen Drehkopfteil-Verschluß (88), der von der genannten Längskammer (46) aufgenommen wird und einen mittleren Durchlaß (87) und eine zylindrische konkave Dichtfläche (89) aufweist, die dem genannten Drehkopfteil (14) gegenüberliegt, dadurch gekennzeichnet, daß

(a) der genannte Drehkopfteil-Verschluß (88) aus einem harten, verstärkten Kunstharzmaterial, wie z.B. einem Acetalpolymer, gebildet ist;

(b) ein Verschlußkolben (76) von der genannten mittleren Einlaßöffnung (50) aufgenommen wird und sich in anliegendem Eingriff mit der Rückfläche des Drehkopfteil-Verschlusses (88) erstreckt und einen mittleren Durchlaß (77) aufweist, der zu dem mittleren Durchlaß (87) des genannten Drehkopfteil Verschlusses ausgerichtet ist; und

(c) Federeinrichtungen (66) den genannten Kolben (76) gegen den genannten Drehkopfteil-Verschluß (88) beaufschlagen.

2. Sprühkopf nach Anspruch 1, dadurch gekennzeichnet, daß das genannte Kunstharzmaterial mit 5 bis 45 Gew.-% Verstärkungsmaterial gefüllt ist.

3. Sprühkopf nach Anspruch 2, dadurch gekennzeichnet, daß das genannte Verstärkungsmaterial aus Glasfasern besteht und in einer Menge von 10 bis 30 Gew.-% zugegen ist.

4. Sprühkopf nach Anspruch 1, 2 oder 3, dadurch gekennzeichnet, daß das Kunstharzmaterial ein Acetalcopolymer ist.

5. Sprühkopf nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß die genannte Federeinrichtung eine Kompressionsfeder (66) ist und die stromaufwärtige Seite des genannten Verschlußkolbens (76) ein Teil (78) mit vermindertem Durchmesser aufweist, der vom stromabwärtigen Ende der genannten Feder (66) aufgenommen wird, um als Federaufnahmehülse zu dienen.

6. Sprühkopf nach einem der Ansprüche 1 bis 5, dadurch gekennzeichnet, daß der genannte Drehkopfteil-Verschluß (88) und Verschlußkolben (76) eine Dichtbaugruppe bilden mit zusammenwirkenden Sperreinrichtungen (90, 92, 74) auf der Abstromseite des genannten Kolbens und der Aufstromseite des genannten Drehkopfteil-Verschlusses.

7. Sprühkopf nach Anspruch 6, dadurch gekennzeichnet, daß die Sperreinrichtung ein Dichtteil (79) mit vermindertem Durchmesser auf der Abstromseite des genannten Kolbens des genannten Drehkopfteil-Verschlusses (88) umfaßt, um das genannte Dichteil in einem Preßsitz aufzunehmen.

8. Sprühkopf nach Anspruch 7 dadurch gekennzeichnet daß eine Dichtscheibe (80) auf dem genannten Dichteil (79) zwischen dem genannten Kolben und Dichtung vorgesehen ist.

9. Sprühkopf nach Anspruch 6, dadurch gekennzeichnet, daß die genannte Sperreinrichtung ein Teil (79) mit vermindertem Durchmesser auf der Abstromseite des genannten Kolbens (76) und eine zentrale Gegenbohrung (93) auf der Aufstromseite des genannten Drehkopfteil-Verschlusses (88) enthalten, um das Teil (79) mit vermindertem Durchmesser in einem Preßsitz aufzunehmen.

10. Sprühkopf nach Anspruch 9, dadurch gekennzeichnet, daß auf dem genannten Kolben (76) eine Dichtscheibe (80) zwischen dem genannten Kolben und dem genannten Drehkopfteil-Verschluß vorgesehen ist.

11. Sprühkopf nach Anspruch 1, dadurch gekennzeichnet, daß an dem genannten Kolben (76) eine Ringnut (75) zum Abdichten des genannten Kolbens in der mittleren Durchlaßöffnung (50) des genannten Kopfgehäuses vorgesehen ist.

12. Sprühkopf nach einem der Ansprüche 1 bis 11, dadurch gekennzeichnet, daß die genannten Anschlußvorrichtung (34) aus einer mit Flansch versehenen Verbindungsbuchse (58) bestehen, die schraubbar von der Rückwand des genannten

Sprühkopfgehäuses (12) aufgenommen werden und eine Aufnahme-Hutmutter (34) einschließen, die über den Aufstromende der genannten Buchse aufgenommen wird, mit einer Dichtscheibe (62) mit niedriger Reibung, die zwischen eine Ringkante (64) der genannten Hutmutter und einem Flansch (60) der Verbindungsbuchse (58) gehalten wird.

Revendications

1. La tête de pulvérisation comprenant un sous-ensemble de corps (12) muni d'un boîtier avec une chambre longitudinale (46) et un alésage cylindrique la traversant orthogonalement sécant (30) et des moyens d'adaptateur (34) pour fixer ledit ensemble de corps à un pistolet de pulvérisation (21) présentant un passage d'entrée central (50) par rapport audit boîtier; un organe cylindrique tournant ou tourelle (14) muni à rotation dans ledit alésage cylindrique traversant (30) et présentant un alésage transversal (52) en alignement avec ladite chambre longitudinale (46); un organe (56) formant orifice de tête de pulvérisation monté à rotation dans ledit alésage transversal (52) et un joint d'organe tournant (88) qui se loge dans ladite chambre longitudinale (46) et présente un passage traversant central (87) et une surface de joint concave cylindrique (89) faisant face audit organe tournant (14), caractérisée en ce que:

(a) ledit joint d'organe tournant (88) est formé en un matériau plastique dur renforcé tel qu'un polymère acétal;

(b) un piston d'étanchéité (76) se loge dans ledit passage d'entrée central (50) et vient en butée avec la face arrière dudit joint d'organe tournant (88) et comporte un passage traversant central (77) aligné sur le passage traversant central (87) dudit joint d'organe tournant; et

(c) des moyens élastiques (66) repoussent ledit piston (76) contre ledit joint d'organe tournant (88).

2. La tête de pulvérisation selon la revendication 1, caractérisée en ce que ledit matériau plastique est chargé de 5 à 45% en poids de matériau de renforcement.

3. La tête de pulvérisation selon la revendication 2, caractérisée, en outre, en ce que ledit matériau de renforcement est de la fibre de verre présente en proportion de 10 à 30% en poids.

4. La tête de pulvérisation selon la revendication 1, 2 ou 3, caractérisée en ce que ledit matériau plastique est un copolymère acétal.

5. La tête de pulvérisation selon l'une quelconque des revendications 1 à 4, caractérisée en ce que ledit moyen élastique est un ressort de compression (66) et en ce que la face amont dudit piston d'étanchéité (76) présente une partie de diamètre réduit (78) qui se loge à l'intérieur de l'extrémité aval dudit ressort (66) pour lui servir d'arrêt.

6. La tête de pulvérisation selon l'une quelconque des revendications 1 à 5, caractérisée en ce que ledit joint d'organe tournant (88) et ledit piston d'étanchéité (76) forment un sous-ensemble de joints avec des moyens de verrouillage coopérants (90, 92, 74) sur la face aval dudit piston et la face amont dudit joint de l'organe tournant.

7. La tête de pulvérisation selon la revendication 6, caractérisée, en outre, en ce que lesdits moyens de verrouillage comprennent une partie (79) d'étanchéité de diamètre réduit sur la face aval dudit piston (76) et un contrealésage central (93) dans la face amont dudit joint d'organe tournant (88) pour recevoir ladite partie d'étanchéité en ajustement serré.

8. La tête de pulvérisation selon la revendication 7, caractérisée, en outre, par la présence d'une rondelle d'étanchéité (80) sur ladite partie d'étanchéité (79) entre lesdits piston et joint.

9. La tête de pulvérisation selon la revendication 6, caractérisée, en outre, en ce que lesdits moyens de verrouillage comprennent une partie de diamètre réduit (79) sur la face aval dudit piston (76) et un contrealésage central (93) sur la face amont dudit joint de l'organe tournant (88) pour recevoir ladite partie de diamètre réduit (79) en ajustement serré.

10. La tête de pulvérisation selon la revendication 9, caractérisée, en outre, par la présence d'une rondelle d'étanchéité (80) sur ledit piston (76), entre ledit piston et ledit joint de l'organe tournant.

11. La tête de pulvérisation selon la revendication 1, caractérisée en ce qu'une rainure annulaire (75) est formée autour dudit piston (76) et qu'un joint torique (80) est logé dans ladite rainure, pour rendre étanche ledit piston dans le passage d'entrée central (50) dudit boîtier de tête de pulvérisation.

12. La tête de pulvérisation selon l'une quelconque des revendications 1 à 11, caractérisée en ce que lesdits moyens d'adaptateur (34) sont constitués par un manchon de connexion à bride (58) qui se monte par tissage dans la paroi arrière dudit boîtier (12) de tête de pulvérisation et comportent un écrou de rétenue à chapeau (34) monté sur l'extrémité amont dudit manchon avec une rondelle support à faible friction (62), emprisonnée prise entre un rebord annulaire (64) dudit écrou à chapeau (34) et la bride (60) du manchon de connexion (58).

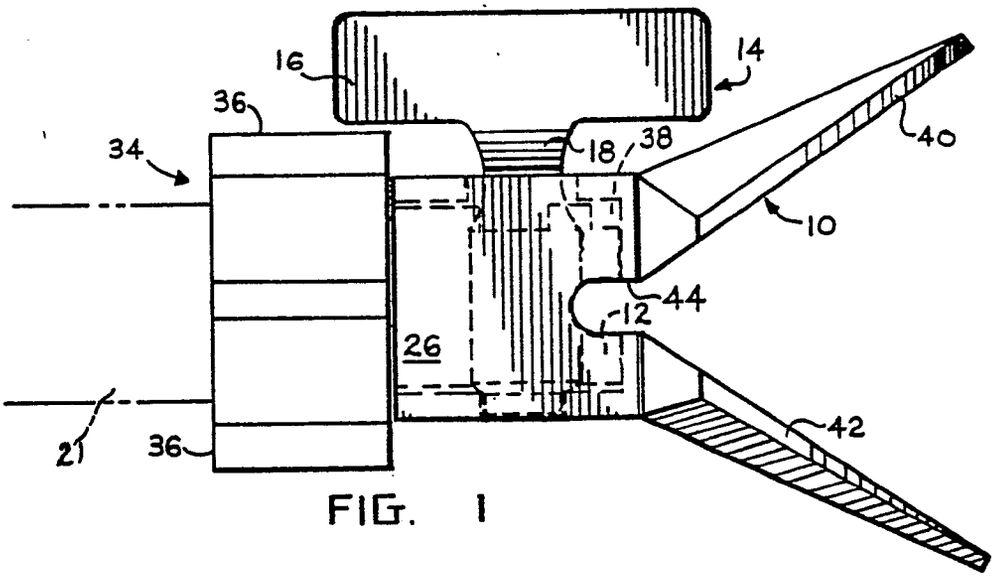


FIG. 1

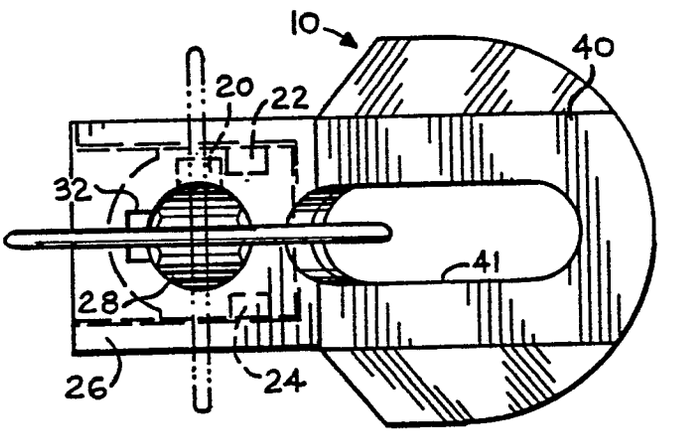


FIG. 2

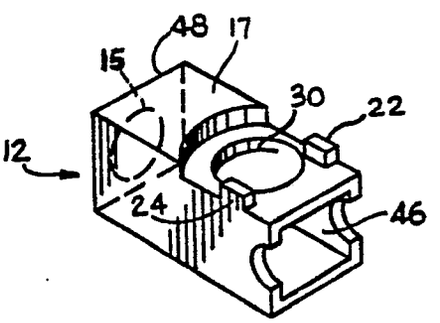


FIG. 3

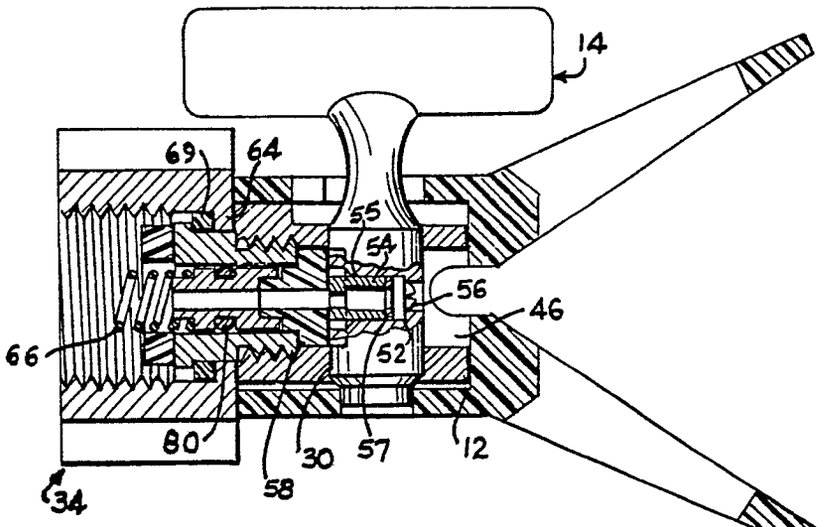


FIG. 4

FIG. 5

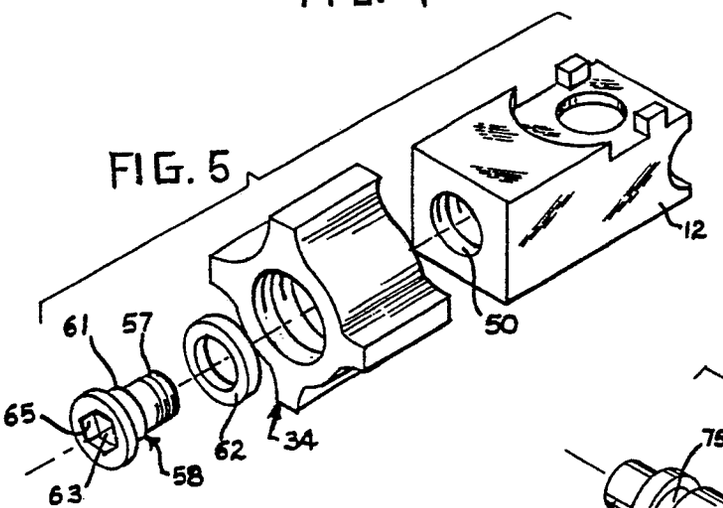
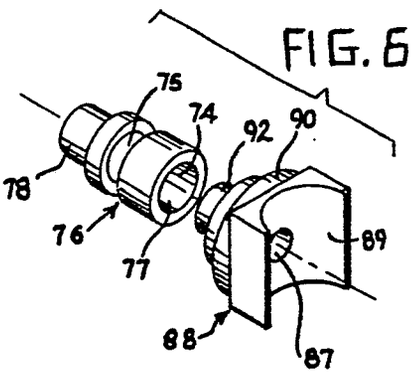


FIG. 6



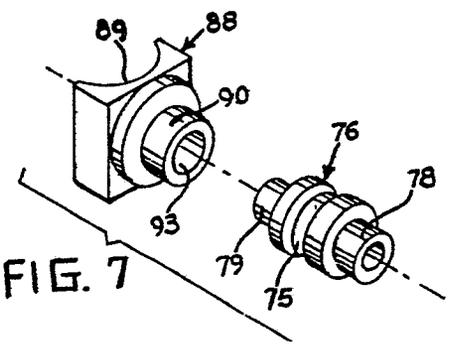


FIG. 7