

March 15, 1966

B. G. BARROWS

3,240,225

SELECTING AND PURGING APPARATUS

Filed Jan. 17, 1963

3 Sheets-Sheet 1

Fig. 1.

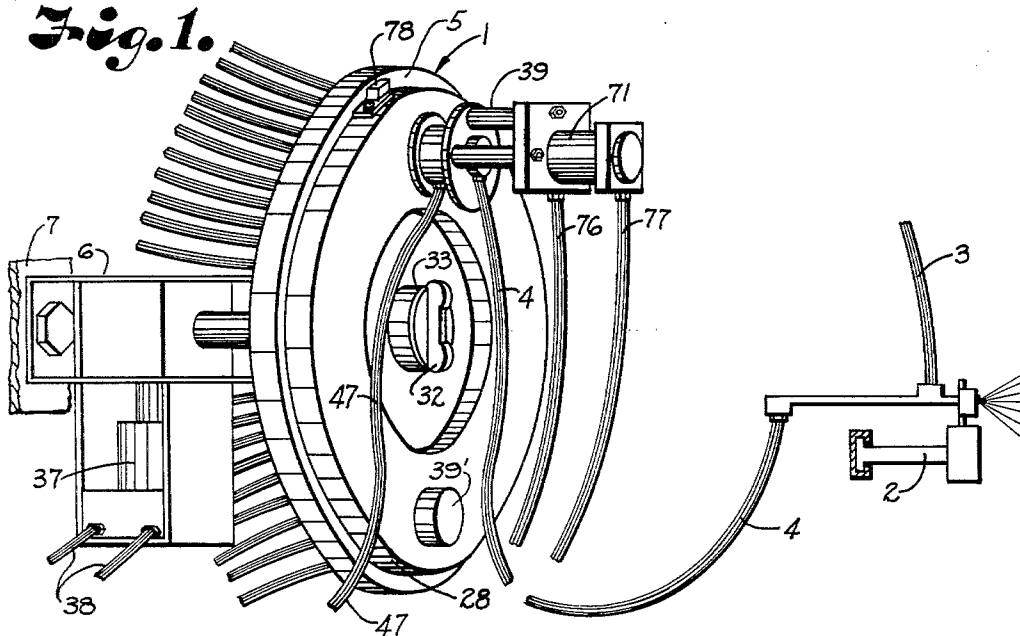
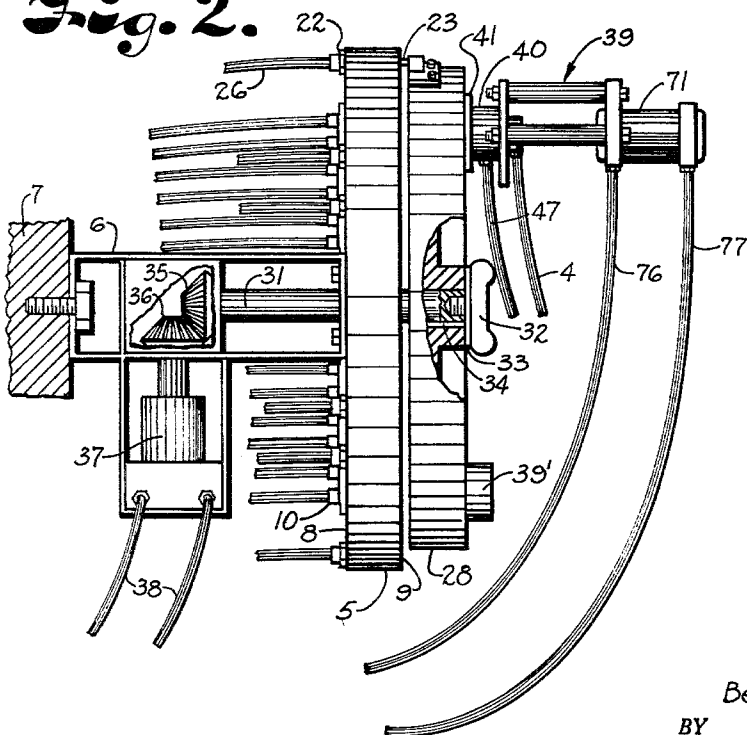


Fig. 2.



INVENTOR.
Benjamin G. Barrows
BY
Fishtven and Gold
ATTORNEYS

March 15, 1966

B. G. BARROWS

3,240,225

SELECTING AND PURGING APPARATUS

Filed Jan. 17, 1963

3 Sheets-Sheet 2

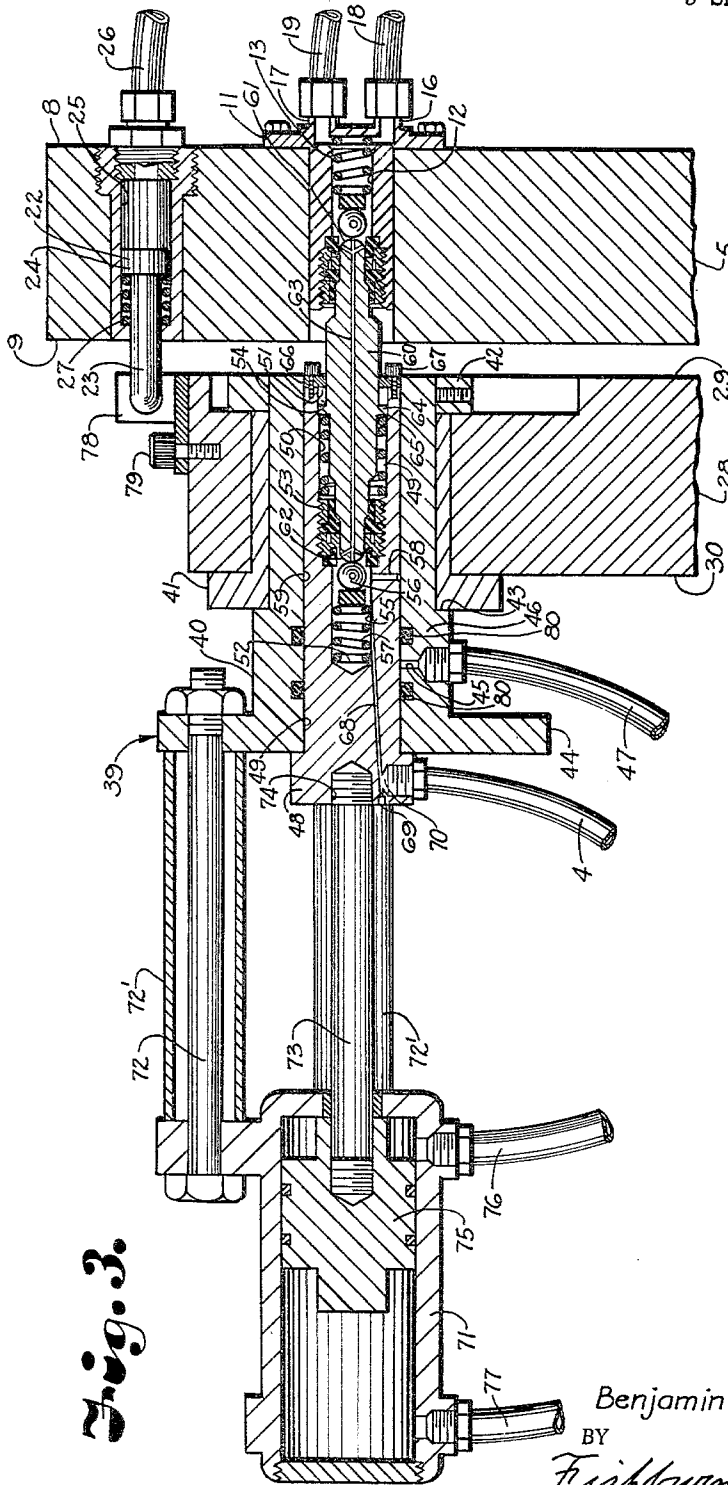


Fig. 3.

INVENTOR.
Benjamin G. Barrows
BY
Fishburn and Gold
ATTORNEYS

March 15, 1966

B. G. BARROWS

3,240,225

SELECTING AND PURGING APPARATUS

Filed Jan. 17, 1963

5 Sheets-Sheet 3

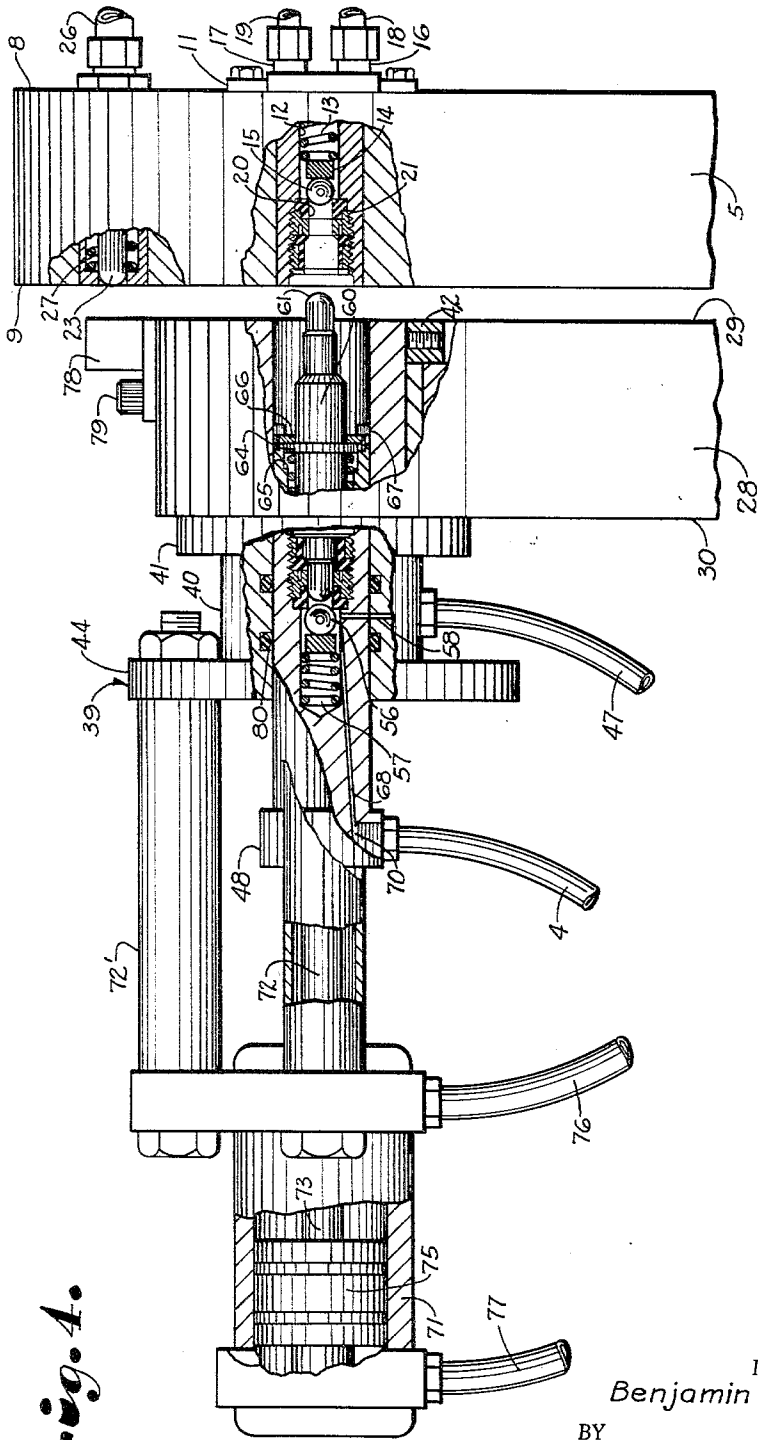


Fig. 4.

INVENTOR
Benjamin G. Barrows

BY
Fishburn and Gold
ATTORNEYS

1

2

3,240,225

SELECTING AND PURGING APPARATUS
 Benjamin G. Barrows, R.R. 26, Kansas City, Mo.
 Filed Jan. 17, 1963, Ser. No. 252,152
 6 Claims. (Cl. 137-240)

This invention relates to selecting and purging devices and more particularly to apparatus for automatically and remotely selecting and directing paint or the like to spray applicators.

A long standing problem has existed in production line painting of articles such as automobile parts due to a constant variation in paint colors. In order to change the paint color directed to spraying apparatus it has been necessary to manually uncouple the spray gun, purge or clean the spraying apparatus of old paint remaining therein and recouple the apparatus to a new source of paint. This constitutes a time consuming and therefore expensive procedure and devices simplifying the uncoupling, cleaning and recoupling steps have heretofore been suggested. Such devices, however, have been either too complex for practical use or required too much manual manipulation to justify incorporation into high production paint lines.

The principal objects of the present invention are: to provide apparatus for selecting and directing paint and the like to spray applicators or other devices which is adapted to perform coupling, cleaning and uncoupling steps automatically on remote command; to provide such an apparatus which is adapted to select a desired paint color from a large number of paint sources; to provide such apparatus which is very simple and inexpensive in construction and yet performs its function rapidly and efficiently; and to provide such paint selecting apparatus which is safe and reliable in use and is well adapted for insertion in completely automated high speed production lines.

Other objects and advantages of this invention will become apparent from the following description taken in connection with the accompanying drawings wherein are set forth by way of illustration and example certain embodiments of this invention.

FIG. 1 is a fragmentary perspective view of paint selecting apparatus embodying this invention.

FIG. 2 is a fragmentary side elevational view of the apparatus particularly showing the relationship between a stationary wheel and a revolving selecting wheel.

FIG. 3 is a fragmentary cross-sectional side elevational view on an enlarged scale particularly showing the coupling assembly in paint flowing position.

FIG. 4 is a fragmentary side elevational view on an enlarged scale showing the coupling assembly in withdrawn or cleaning and paint selecting position.

Referring to the drawings in more detail:

The reference numeral 1 generally indicates apparatus embodying this invention for selecting and directing paint and the like to receiving devices, in the illustrated example conventional paint spray apparatus 2 which paint spray apparatus may be of the automatically traversing type for use in completely automated production lines. The apparatus 2 has a suitable source 3 of air under pressure for accelerating the paint supplied thereto from a hose 4. The apparatus 1 includes a stationary wheel 5 supported by a suitable bracket 6 secured to a structural member 7. The bracket 6 supports the stationary wheel 5 spaced a

substantial distance forwardly of the structural member 7 permitting easy access to the rear face 8 thereof for reasons apparent hereinafter.

The stationary wheel 5 has a front face 9 facing oppositely of the rear face 8 and a plurality of paint dispenser fittings 10 mounted in circumferentially spaced relation by means of suitable clamp ears 11. The dispenser fittings 10 are of the axial pressure ball check release type having a circulating input chamber 12 containing a resilient compression spring 13 engaging a spacer 14 which in turn engages a check ball 15 contained within the chamber 12. A pair of input connectors 16 and 17 on each of the fittings 10 are located adjacent the rear face 8 and communicate with the input chambers 12. A pair of paint carrying hoses 18 and 19 are respectively secured to the connectors 16 and 17 for continuously circulating paint under pressure through the input chambers 12. The dispenser fittings 10 each have an elongated receiving socket 20 axially opening into the stationary wheel front face 9 and the receiving sockets 20 each have a ring seal assembly 21 therein against which the check ball 15 is normally urged by the spring 13 to prevent paint circulating through the input chamber 12 from flowing through the receiving socket 20.

A pressure operated sliding plunger assembly 22 is threadedly mounted on the stationary wheel 5 adjacent each of the dispenser fittings 10 and in circumferentially spaced relation on a greater diameter than the dispenser fittings. The plunger assembly 22 includes a positioning pin 23 terminating rearwardly in a piston 24 slidably engaged in an elongated cylindrical chamber 25. Pressure transmitting hoses 26 are connected to the plunger assembly 22 and communicate with the respective chambers 25. The hoses 26 extend rearwardly of the wheel rear face 8 and pressure is communicated thereby into the chambers 25 to selectively urge the pistons 24 forwardly causing the positioning pin 23 to extend forwardly of the stationary wheel front face 9. A resilient compression spring 27 causes the withdrawal of the positioning pin 23 when pressure in the attached hose 26 is released.

A revolving wheel 28 is of smaller diameter than the stationary wheel 5 and has a front face 29 and a rear face 30. A support shaft 31 extends axially through the stationary wheel 5 and is fixed to the revolving wheel 28 supporting same in coaxial front face adjacent relation to the stationary wheel. A wing bolt 32 is coaxially threadedly received in the end of the support shaft 31 at 33 and a suitable key 34 engages between the shaft 31 and the revolving wheel 28 to maintain the wheel 28 rotatably fixed to the shaft 31 but removable for cleaning. The shaft 31 is rotatably mounted on the bracket 6 and terminates at the rear end thereof in a bevel gear 35 which engages with a mating bevel gear 36 fixed to the output of a suitable motor 37 also supported on the bracket 6. The motor 37 may be powered by any suitable means, preferably by hydraulic fluid circulating through hoses 38 to avoid the possibility of sparks in an explosive atmosphere. It is to be understood that the powering of the motor 37 results in an axial rotation of the revolving wheel 28 with respect to the stationary wheel 5.

A coupling assembly 39 is mounted on the revolving wheel 28 on a radius corresponding to the circumferential positioning of the fittings 10. A counterweight 39' balances the coupling assembly on the wheel 28. The coupling assembly 39 includes a support sleeve 40 ro-

tatably mounted by means of a sleeve bearing 41 on the revolving wheel 28 and longitudinally restrained by means of a wheel engaging collar 42 at one end thereof and a bearing engaging shoulder 43 intermediate the ends thereof. The supporting sleeve 40 has a rear flange portion 44 extending radially outwardly therefrom for a purpose noted hereinafter. A transverse passageway 45 extends through the wall 46 of the support sleeve 40 in the rear portion thereof and a paint thinner or cleaning solvent carrying hose 47 communicates with the passageway 45.

A ram 48 is longitudinally reciprocally slidable in the sleeve 40 and has cylindrical walls 49 forming an axially extending chamber 50 therein having an open forward end 51 and a closed rear end 52. The chamber 50 has a ring seal assembly 53 intermediate the ends thereof dividing the ram chamber into a front portion 54 and a rear portion 55. The rear portion 55 has a check ball 56 therein and contains a helical compression spring 57 for resiliently urging the check ball 56 into sealing engagement with the chamber ring seal assembly 53.

A transverse passageway 58 extends into the ram 48 and communicates between the ram chamber rear portion 55 and the support sleeve 40. The transverse passageway 58 terminates in an outer ring groove 59 extending transversely around the exterior surface of the ram 48. The ram passageway 58, through the ring groove 59, communicates with the support sleeve passageway 45 when the ram is reciprocated rearwardly in the sleeve as illustrated in FIG. 4, the support sleeve 40 inside surface sealing the passageway 58 when the ram is reciprocated forwardly in the sleeve to the position illustrated in FIG. 3.

The ram chamber front portion 54 has an elongated coupling pin 60 slidable longitudinally axially therein and terminating at opposite ends thereof in perforated forward and rear tips 61 and 62 respectively communicating with each other through a longitudinal internal passageway 63. The coupling pin 60 is limited in the longitudinal travel thereof by means of a shoulder 64 engageable with an annular ridge 65 formed in the front portion 54 and a retaining ring 66 secured at the front of the ram by means of suitable screws 67. The forward tip 61 extends forwardly from the chamber forward end and is receivable in the respective fitting sockets 20 where, under longitudinal pressure by apparatus described hereinafter, it seals against the ring seal assembly 21 as it contacts and urges the check ball 15 rearwardly providing communication between the passageway 63 and the circulating input chamber 12.

The rear tip 62 of the coupling pin 60 is slidably engageable with the ram chamber ring seal assembly 53 for sealing about same while unseating the check ball 56 providing communication between the passageway 63 and the chamber rear portion 55. A helical compression spring is located in the forward chamber portion 54 and resiliently urges the coupling pin 60 forwardly to aid in the removal of the rear tip 62 from within the sealing assembly 53 to permit the seating of the check ball 56 thereagainst during paint selection.

A passageway 68 is plugged at 69 and extends generally longitudinally through the ram 48 and communicates at one end thereof in the chamber rear portion 55 and at the other end thereof in a receiving socket 70 for coupling to the paint hose 4.

A fluid operated piston ram assembly 71 is mounted on and extends rearwardly of the support sleeve flange portion 44 by means of elongated bolts 72 surrounded by sleeves 72' and has an axially reciprocal rod 73 secured to and coaxial with the ram 48 at 74. The piston ram assembly 71 has a piston 75 longitudinally reciprocal therewithin and secured to the rod 73 for axial motion therewith. Suitable fluid pressure transmitting hoses 76 and 77 introduce fluid under pressure into the ram assembly 71 for reciprocating the ram 48 longitudinally within the support sleeve 40.

A stop block 78 is mounted by means of a screw 79 onto the periphery of the revolving wheel 28 and is positioned

to selectively engage the positioning pins 23 for rotatably aligning the coupling assembly 39 with selected dispenser fittings 10.

In operation, a selected positioning pin 23 is extended and the motor 37 is actuated to rotate the revolving wheel 28 until the selected positioning pin 23 (corresponding to the desired paint color) engages the stop block 78. The piston ram assembly 71 is then actuated to reciprocate the ram 48 forwardly whereupon the coupling pin 60 engages the check balls 15 and 56, unseating same, and providing communication between the circulating input chamber 12 and the paint hose 4 which permits the dispensing of the selected paint from the paint spray apparatus 2. The rotation of the revolving wheel 28 does not cause a winding of the hoses 4, 47, 76 and 77 since the entire coupling assembly 39 rotates about the longitudinal axis thereof in the sleeve bearing 41. The forward reciprocation of the ram 48 seals the transverse passageway 45 and the passageway 58 preventing any communication therebetween and suitable ring seals 80 are provided on opposite sides of the passageway 45 to insure the elimination of possible solvent leakage.

When it is desired to change colors in the paint spray apparatus 2 the piston ram assembly is actuated to withdraw the ram 48 to the position illustrated in FIG. 4, the positioning pin 23 is withdrawn and a new positioning pin corresponding to the next desired color is extended. The withdrawal of the ram 48 results in the sealing engagement of the check ball 15 against the ring seal assembly 21 preventing paint leakage from the circulating input chamber 12 but permitting continuous circulation therethrough to avoid the settling out of certain constituents of the paint. The withdrawal of the ram 48 also results in a communicating alignment between the passageways 45 and 58 whereupon the cleaning solvent maintained under pressure in the hose 47 rushes into the ram chamber rear portion 55 flushing and cleaning same as well as the passageway 68, paint hose 4, and paint spray apparatus 2. Simultaneously with the withdrawal of the ram 48 the check ball 56 seals against the ring seal assembly 53 in the chamber 50 so that solvent will not leak forwardly from the ram. It is noted that the very minute amount of paint left in the passageway 63 of the coupling pin 60 does not effect the subsequent paint application since it is cleared by succeeding paint flow along with the solvent left in the hose 4 and paint spray apparatus 2 just prior to paint application on the next succeeding part.

It is to be understood that while one form of this invention has been illustrated and described it is not to be limited to the specific form or arrangement of parts herein described and shown except insofar as such limitations are included in the claims.

What I claim and desire to secure by Letters Patent is:
1. In a coupling assembly adapted for automatic purging when uncoupled:

- (a) a support member having a wall with a passageway extending therethrough, purging solution carrying means communicating with said support member passageway,
- (b) a ram reciprocally slidable within said support member and having a wall forming an axially extending chamber therein with a rear portion, a flow transmitting coupling member having a flow passageway therethrough associated with said ram and at least partially in said chamber, valve means in said chamber between said coupling member and said chamber rear portion and operative to prevent flow through said coupling member into said chamber rear portion upon a predetermined reciprocation movement of said ram in one direction and permit flow into said chamber rear portion upon a predetermined reciprocation movement in the opposite direction, means forming a dispensing passageway communicating with said chamber rear portion,
- (c) a ram passageway in said ram and communicating

between said ram chamber rear portion and said support member, said ram passageway communicating with said support member passageway when said ram is reciprocated in said one direction, said support member wall sealing said ram passageway and said ram wall sealing said support member passageway when said ram is reciprocated in said opposite direction, and

(d) means for selectively reciprocating said ram.

2. The structure as set forth in claim 1 wherein said coupling member is:

(a) a coupling pin slidable longitudinally toward and away from said rear portion of said chamber and terminating at opposite ends thereof in perforated forward and rear tips communicating with each other through a longitudinal passageway,

(b) said forward tip extending from said ram for coupling upon reciprocation in said opposite direction.

3. The apparatus of claim 1 wherein said ram reciprocating means comprises:

(a) a fluid operated piston ram assembly mounted on said support member and having an axially reciprocal rod secured to and coaxial with said ram.

4. A coupling assembly comprising:

(a) an axial connecting fitting, a support sleeve having a wall with a passageway extending therein, a flushing solution carrying member communicating with said sleeve passageway,

(b) a ram longitudinally reciprocally slidable in said sleeve and having a well forming an axially extending chamber therein with an open forward end, said ram chamber having a seal intermediate the ends thereof dividing said ram chamber into a front portion and a rear portion, said ram chamber rear portion having a check valve member therein including resilient means normally resiliently maintaining said check valve member in sealing engagement with said chamber seal, means forming a dispensing passageway communicating with said ram chamber rear portion,

(c) a ram passageway in said ram and communicating between said ram chamber rear portion and said support sleeve, said ram passageway communicating with said support sleeve passageway when said ram is reciprocated rearwardly in said sleeve, said support sleeve wall sealing said ram passageway and said ram wall sealing said sleeve passageway when said ram is reciprocated forwardly in said sleeve,

(d) said ram chamber front portion having a coupling pin slidable longitudinally therein and terminating at opposite ends thereof in perforated forward and rear tips communicating with each other through a longitudinal passageway, said forward tip extending forwardly from said ram chamber forward end and being axially receivable in said fitting, said rear tip being engageable with said ram chamber seal while resiliently unseating said check valve member, and

(e) means for selectively reciprocating said ram to provide selective communication between said fitting and said dispensing passageway.

5. Apparatus for selecting and directing fluids comprising:

(a) a fluid receiver, a stationary member having a front face, a plurality of self sealing fluid dispenser fittings mounted on said stationary member in circumferentially spaced relation, said dispenser fittings each being of the axial pressure release type and having a receiving socket axially opening into said stationary member front face,

(b) a movable member having a front face, means supporting said movable member in front face adjacent relation to said stationary member and for rotation with respect to said stationary member,

(c) a reciprocally extendible and retractable coupling

assembly mounted on said movable member on a radius corresponding to the circumferential positioning of said fittings, a fluid carrying conduit communicating between said coupling assembly and said receiver, a flushing solution carrying conduit secured to said coupling assembly, and

(d) means operably connected to said coupling assembly for selectively extending same into coupling relation with a selected fitting and retracting same out of coupling relation, said coupling assembly including valve means operatively responsive to the extension and retraction of said coupling assembly to permit the passage of flushing solution into said fluid carrying conduit when said coupling assembly is retracted and to permit the passage of fluid from said selected fitting into said conduit and stop the passage of flushing solution into said conduit when extended.

6. Apparatus for selecting and directing fluids comprising:

(a) a fluid receiver, a stationary member having a front face and a rear face, a plurality of self sealing dispenser fittings mounted on said stationary member in spaced relation,

(b) said dispenser fittings each being of the axial pressure release type having an input chamber, supply connectors on each of said fittings and communicating with said input chambers, said fittings each having an elongated receiving socket axially opening into said stationary member front face, a seal in said sockets,

(c) positioning means mounted on said stationary wheel and associated with each of said dispenser fittings,

(d) a movable member having a front face and a rear face, means for supporting said movable member in front face adjacent relation to said stationary member, motive means engaging said movable member for selectively moving same with respect to said stationary member,

(e) coupling assembly mounted on said movable member and including a support sleeve having a wall with a transverse passageway extending therethrough, a flushing solution carrying member communicating with said sleeve passageway,

(f) a ram longitudinally reciprocally slidable in said sleeve and having a wall forming an axially extending chamber therein with an open forward end, said ram chamber having a seal intermediate the ends thereof dividing said ram chamber into a front portion and a rear portion, said ram chamber rear portion having a check valve member therein including resilient means normally resiliently maintaining said check valve member in sealing engagement with said chamber seal,

(g) a ram passageway in said ram and communicating between said ram chamber rear portion and said support sleeve, said ram passageway being positioned for communicating with said support sleeve passageway when said ram is reciprocated rearwardly in said sleeve, said support sleeve wall sealing said ram wall passageway and said ram wall sealing said sleeve passageway when said ram is reciprocated forwardly in said sleeve,

(h) said ram chamber front portion having a coupling pin slidable longitudinally therein and terminating at opposite ends thereof in perforated forward and rear tips communicating with each other through a longitudinal passageway, said forward tip extending forwardly from said ram chamber forward end and being axially receivable selectively in said fitting sockets for sealing with said socket seal and communicating with said input chamber, said rear tip being engageable with said ram chamber seal while resiliently unseating said check valve member,

(i) a power extensible assembly mounted on said

7

support sleeve and having an axially reciprocal rod secured to said ram,

(j) means mounted on said movable member and positioned to selectively engage said positioning means for aligning said coupling assembly with a selected dispenser fitting, and

(k) means forming a passageway communicating between said ram chamber rear portion and said receiver whereby upon actuation of said power extensible assembly communication is provided between

8

a selected dispenser fitting input chamber and said receiver.

References Cited by the Examiner

UNITED STATES PATENTS

2,257,004	9/1941	Fleming	-----	239—112
3,128,787	4/1964	Knight	-----	137—594

ISADOR WEIL, *Primary Examiner.*