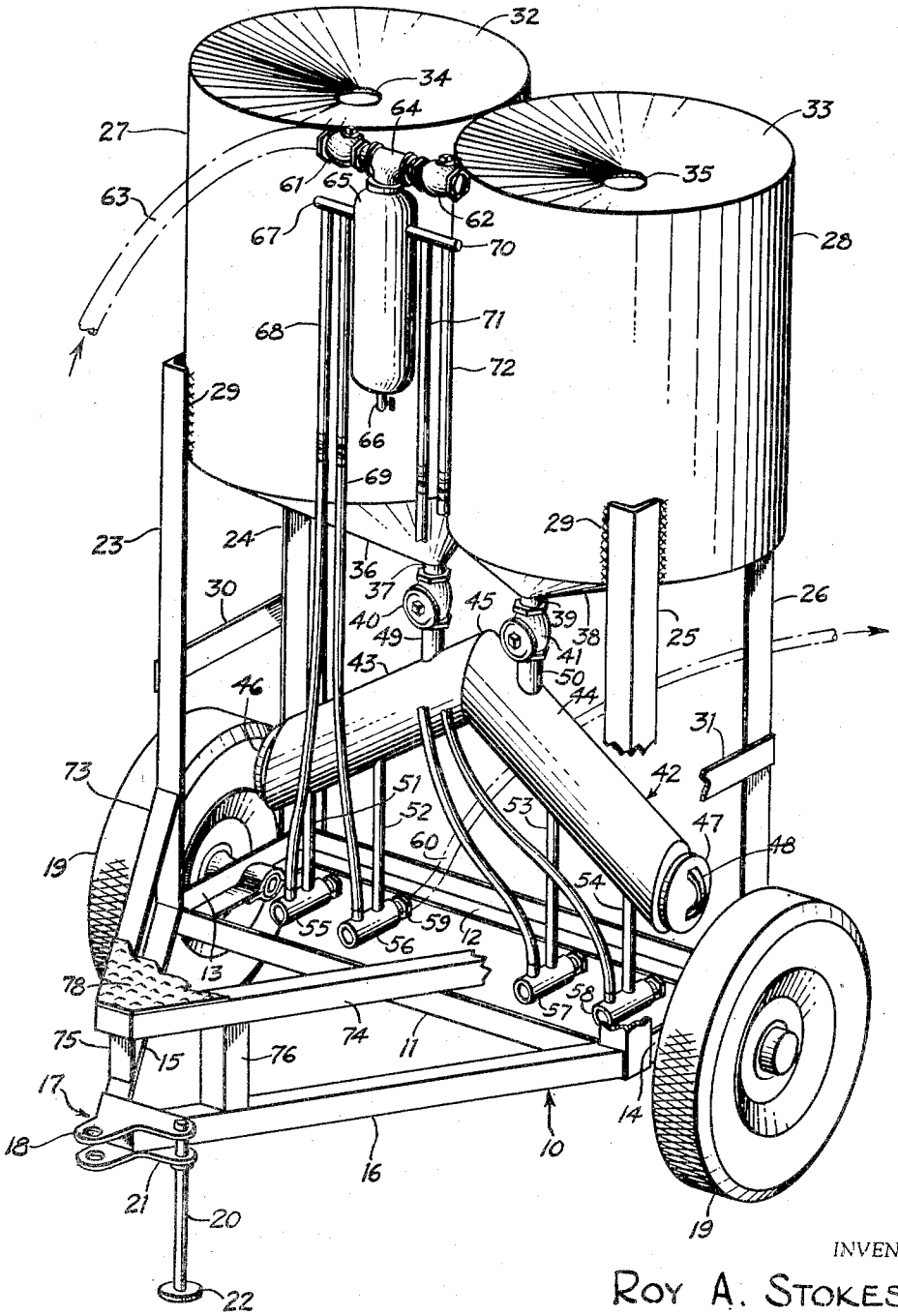
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PORTABLE ABRASIVE CONTAINING AND FEEDING APPARATUS

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PORTABLE ABRASIVE CONTAINING AND FEEDING APPARATUS

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This invention relates to the feeding of fluent materials and more particularly to an apparatus for storing and feeding an abrasive, such as sand, to one or more nozzles where the same may be utilized for sand blasting or other analogous operations.

Heretofore, many types of abrasive feeding units have been developed and utilized, but the majority of these have included only a single container for the abrasive, thereby limiting the capacity of the apparatus and, at the same time, requiring the complete apparatus to be emptied and cleaned if it is desired to use another grade or size of abrasive. Furthermore, with these prior art devices, it has only been possible to supply a limited number of blasting nozzles and no provision has been made for feeding such nozzles from one abrasive container while a second container is being filled. As is well-known, most abrasives are relatively heavy and consequently, if a sufficient quantity thereof is to be contained and transported for abrading operations at widely spaced locations, it has been necessary to provide a relatively large container if a sufficient quantity of the abrasive is to be carried thereby. The provision of one large container has introduced many problems of design, in view of the weight carried therein and consequently, a containing and feeding apparatus in which the abrasive may be contained in more than one container results in greatly simplifying the design and construction. It is also to be noted, that an apparatus utilizing multiple containers may be made considerably lighter than an apparatus for containing an equivalent quantity of abrasive and where only a single container is provided.

It is accordingly an object of the invention to provide an abrasive containing and feeding apparatus in the form of a small trailer having ground-engaging wheels and incorporating a plurality of containers for the abrasive together with suitable feeding means for the same.

A further object of the invention is the provision of a portable abrasive containing and feeding apparatus including a plurality of containers for the abrasive and means for selectively feeding such abrasive from either or both containers.

A still further object of the invention is the provision of a portable abrasive containing and feeding apparatus including a plurality of containers for such abrasive and in which different grades of abrasive may be placed in each container and one or the other grade of abrasive selectively fed to the blasting nozzles.

Another object of the invention is the provision of a portable abrasive containing and feeding apparatus including a plurality of abrasive containers and in which abrasive may be fed from one container while another container is being refilled.

A further object of the invention is the provision of a portable abrasive containing and feeding apparatus including a plurality of containers for the abrasive together with means for introducing fluid pressure to abrasive ejector means which may be coupled to blasting nozzles.

A still further object of the invention is the provision

of a portable abrasive containing and feeding apparatus in which the entire load of abrasive is distributed between a plurality of containers thereby precluding the necessity of providing a single, relatively large container of massive construction in order to support the relatively heavy abrasive material.

A further object of the invention is the provision of a portable abrasive containing and feeding apparatus which may be conveniently and economically constructed from readily available materials and with a capacity several times that normally found in abrasive apparatus of this nature incorporating a single abrasive container.

Further objects and advantages of the invention will be apparent from the following description taken in conjunction with the accompanying drawing wherein the single figure is a view in perspective with parts broken away for greater clarity and showing a portable abrasive containing and feeding apparatus constructed in accordance with this invention.

With continued reference to the drawing there is shown a portable abrasive containing and feeding apparatus constructed in accordance with this invention and comprising a chassis 10 which may be made up of cross-frame members 11 and 12 connected by side frame members 13 and 14 to which may be attached converging side frame members 15 and 16 forming an A frame and terminating at their apex in a trailer-hitch or coupling 17. The coupling or hitch 17 may be provided with aligned apertures 18 for receiving a pin to connect the same to a draw bar extending from any suitable towing vehicle. Rotatably mounted at suitable locations on each side of the chassis 10 are ground engaging wheels 19 and in order that the chassis 10 may be supported in more or less level position when detached from the towing vehicle, there may be supplied a supporting leg or prop 20 which may be adjustably received in ears 21 projecting from the hitch or coupling 17 adjacent the apex of the forward portion of the chassis 10 and foot or prop 20 may be provided adjacent the lower end thereof with an enlarged ground-engaging shoe 22.

Extending upwardly from the chassis 10 is a framework which may comprise upstanding members 23, 24, 25 and 26 of angle iron or other suitable structural members and these members may serve to support containers 27 and 28 for receiving abrasive material. The containers 27 and 28 may be welded to the upstanding frame members, as shown at 29, or may be secured thereto by any other suitable means, and the upstanding frame members 23 and 24 may be reinforced by a cross brace member 30 and the members 25 and 26 reinforced by a cross brace member 31.

As shown in the drawing, the containers 27 and 28 are cylindrical in shape and are provided at their upper ends with generally concave top walls 32 and 33 which may be provided with centrally located apertures 34 and 35 to facilitate filling of the containers. The concave top walls 32 and 33 in effect provide funnels which will serve to receive the abrasive material and direct the same to the filling apertures 34 and 35. The container 27 is provided with a convex bottom wall 36 at the apex of which is attached an outlet fitting 27 and the container 28 is provided with a convex bottom wall 38 at the apex of which is attached an outlet fitting 39. Convex bottom walls 36 and 38 serve to direct the flow of abrasive material in the containers 27 and 28 respectively to the outlet fitting 37 and 39. Secured to the outlet fitting 37 is a cutoff valve 40 and secured to the outlet fitting 39 is a cutoff valve 41. The purpose and operation of these valves will be presently described.

Directly below the containers 27 and 28 there is disposed an abrasive mat receiving manifold 42 of inverted V-shape and this manifold 42 may well comprise op-

positely extending, downwardly inclined conduits 43 and 44, these conduits being joined together at 45 and being provided at their opposite ends with clean out closures 46 and 47 respectively. The closures 46 and 47 may be provided with finger-engaging handles 48 to facilitate manipulation thereof and such closures may be conveniently removed to facilitate cleaning of the conduits 43 and 44 and when replaced will prevent flow of abrasive material from each end of the manifold 42. The conduit 43 is connected to the cutoff valve 40 through a nipple 49 and the conduit 44 is connected to the cutoff valve 41 through a nipple 50. It will therefore be seen, that by manipulation of valve 40 and valve 41 that flow of abrasive material from containers 27 and 28 to the conduits 43 and 44 of the manifold 42 may be selectively controlled and such material supplied to either conduit 43 or 44 or to both conduits simultaneously. This permits using different grades of abrasive in each container 27 or 28 or permits the use of one container while the other container is being refilled with abrasive material.

Extending downwardly from conduit 43 of manifold 42 are abrasive feeding conduits 51 and 52, but obviously, if desired, a larger number of such conduits could well be supplied. Likewise, abrasive feeding conduits 53 and 54 extend downwardly from the conduit 44 of manifold 42 and at the lower end of each of these feeding conduits there is attached abrasive ejectors 55, 56, 57 and 58 respectively. Each ejector is provided with a coupling 59 to which may be attached a discharge hose 60, which hose may lead to a suitable blasting nozzle or to any other device designed to be fed with abrasive from the apparatus of this invention. The coupling 59 may be of the well known type which automatically closes the outlet from the ejector 56 upon uncoupling of the hose 60 and automatically opens this outlet upon coupling the hose 60 to the appropriate ejector. In this way, any or all of the ejectors may be utilized as required by the operations being performed.

Supported in any suitable location on the apparatus, but preferably on the front side of the containers 27 and 28 is a fluid pressure connection including control valves 61 and 62 to either of which may be connected a suitable conduit 63 communicating with a source of fluid pressure. Valves 61 and 62 communicate with a T connected 64 which in turn is connected to a moisture or oil separator 65. The specific construction of the separator 65 forms no part of this invention and consequently, a detailed description thereof is considered unnecessary. However, this separator 65 is so constructed as to separate any moisture or oil in the pressure fluid utilized in this apparatus, in order that the same will not in any way contaminate abrasive being fed thereby. The separator 65 is provided at the bottom thereof with a drain cock 66 which may be utilized to drain off any moisture or oil collecting in the separator 65.

Connected to the separator 65 is a fluid pressure manifold 67 from which conduit 68 is connected to ejector 55 and conduit 69 to ejector 56. A second fluid pressure manifold 70 is also connected to the sepaartor 65 and from this manifold a conduit 71 connects to the ejector 57 and a conduit 72 to the ejector 58. While separate manifolds 67 and 70 are shown and described, obviously a single manifold might be connected to the separator 65 and suitable conduits lead from this manifold to the appropriate ejectors.

It will be seen that by this construction fluid pressure is continually supplied to each of the ejectors 55, 56, 57 and 58 and that operation of such ejectors is controlled by coupling or uncoupling of the discharge hose 60 to each ejector.

In order to facilitate filling of the containers 27 and 28, there may be provided a frame comprising side members 73 and 74 connected to the upstanding frame members 23 and 25, and supported above the side frame members 15 and 16 of the chassis 10 by upstanding members 75 and 76. The frame composed of the side members 73 and 74 may be of the same general shape as the lower A frame and in order to provide a suitable platform may be covered with suitable sheet material, such as sheet steel 78. This platform may have suitable projections or indentations in the material thereof in order to provide a firm footing for the operator of the apparatus.

The containers 27 and 28 may be made of any desired size within the practical limits of the device and it has been found that these receptacles may conveniently vary from one which will hold five hundred pounds of abrasive material to one which will hold five thousand pounds. In other words, the total capacity of an apparatus of this nature could well be one thousand pounds of abrasive material. In operation the receptacles or containers 27 and 28 may be filled with abrasive material of the same grade or two different grades of such material may be utilized, one in each receptacle, and by opening both valves 40 and 41, such abrasive material will be fed to both the conduits 43 and 44 of the manifold 42 and also such material will be fed to all of the ejectors 55, 56, 57 and 58. Assuming that a discharge hose 60 is connected to each ejector, consequently, it will be possible to supply four blast nozzles simultaneously. Likewise, if either valve 40 or 41 is closed, the abrasive material will be fed to the appropriate conduit 43 or 44 of the manifold 42, and also to either the ejectors 55 and 56 or the ejectors 57 and 58. In this way, abrasive of one grade can be fed to two of the ejectors and abrasive of a different grade may be fed to the other two ejectors. Also, if it is desired, abrasive material may be fed from one container until the same is substantially empty and then the feed shifted to the other container while the first container is being refilled. In this way, no delay in operation of the apparatus for refilling is necessary and continuous blasting operations may be carried out.

The apparatus of this invention is conveniently portable and may be towed from place to place by a suitable vehicle, and there uncoupled for convenient operation and in view of the relatively large capacity of this apparatus it is frequently entirely possible to carry out one entire job without refilling the same.

It will be obvious to those skilled in the art that various changes may be made in the invention without departing from the spirit and scope thereof and therefore the invention is not limited by that which is shown in the drawing and described in the specification, but only as indicated in the appended claims.

What is claimed is:

1. A portable abrasive containing and feeding apparatus comprising a chassis, ground engaging wheels on said chassis, means on said chassis for coupling the same to a towing vehicle, a supporting frame extending upwardly from said frame, a pair of abrasive containers mounted on said frame, each container having a cylindrical side wall, a convex bottom wall and a concave top wall, a filling opening in said top wall at the lowermost point thereof, an outlet fitting secured to said bottom wall at the apex thereof, an inverted V-shaped abrasive manifold disposed beneath said containers with the apex of said manifold disposed substantially midway between said containers and providing downwardly inclined, oppositely extending conduits, an abrasive cutoff valve connecting the outlet fitting on each container to the adjacent conduit whereby upon manipulation of said valves, abrasive may be selectively fed to either or both conduits, a removable clean-out closure on the outer end of each conduit, a plurality of abrasive feeding tubes connected to the lower sides of each conduit, a fluid pressure abrasive ejector connected to each feeding tube, means for connecting a discharge hose to each ejector, a moisture separator mounted on said apparatus, means for connecting a source of fluid pressure to the inlet of said separator, a fluid pressure manifold connected to the outlet of said separator and conduits connecting said fluid pressure manifold and each ejector whereby one or a plurality of

said ejectors may be selectively utilized and whereby certain of said ejectors may be selectively supplied with abrasive from either or both.

2. A portable abrasive container and feeding apparatus comprising a chassis, ground engaging wheels on said chassis, means on said chassis for coupling the same to a towing vehicle, a supporting frame extending upwardly from said chassis, a pair of abrasive containers mounted on said frame, each container having a convex bottom wall and a concave top wall, a filling opening in said top wall at the lowermost point thereof, an outlet fitting secured to said bottom wall at the apex thereof, an inverted V-shaped abrasive manifold disposed beneath said containers with the apex of said manifold disposed substantially midway between said containers and providing downwardly inclined, oppositely extending conduits, an abrasive cutoff valve connecting the outlet fitting on each container to the adjacent conduit whereby upon manipulation of said valves, abrasive may be selectively fed to either or both conduits, a removably cleanout closure on the opposite end of each conduit, a plurality of abrasive feeding tubes connected to the lower sides of each conduit, a fluid pressure abrasive ejector connected to each feeding tube, means for connecting a discharge hose to each ejector, a moisture separator mounted on said apparatus, means for connecting a source of fluid pressure to the inlet of said separator, a fluid pressure manifold connected to the outlet of said separator and conduits connecting said fluid pressure manifold and each ejector whereby one or a plurality of said ejectors may be selectively utilized and whereby certain of said ejectors may be selectively supplied with abrasive from either or both container.

3. A portable abrasive containing and feeding apparatus comprising a chassis, ground engaging wheels on said chassis, means on said chassis for coupling the same to a towing vehicle, a supporting frame extending upwardly from said chassis, a pair of abrasive containers mounted on said frame, each container having a convex bottom wall and a concave top wall, a filling opening in said top wall at the lowermost point thereof, an outlet fitting secured to said bottom wall at the apex thereof, an inverted V-shaped abrasive manifold disposed beneath said containers with the apex of said manifold disposed substantially midway between said containers and providing downwardly inclined oppositely extending conduits, an abrasive cutoff valve connecting the outlet fitting on each container to the adjacent conduit whereby upon manipulation of said valves, abrasive may be selectively fed to either or both conduits, a plurality of abrasive feeding tubes connected to the lower sides of each conduit, a fluid pressure abrasive ejector connected to each feeding tube, means for connecting a discharge hose to each ejector, a moisture separator mounted on said apparatus, means for connecting a source of fluid pressure to the inlet of said separator, a fluid pressure manifold connected to the outlet of said separator and conduits connecting said fluid pressure manifold and each ejector whereby one or a plurality of said ejectors may be selectively utilized and whereby certain of said ejectors may be selectively supplied with abrasive from either or both containers.

4. A portable abrasive containing and feeding apparatus comprising a chassis, ground engaging wheels on said chassis, means on said chassis for coupling the same to a towing vehicle, a supporting frame extending upwardly from said chassis, a pair of abrasive containers mounted on said frame, each container having a convex bottom wall and a concave top wall, a filling opening on said top wall at the lowermost point thereof, an outlet fitting secured to said bottom wall at the apex thereof, an inverted V-shaped abrasive manifold disposed beneath said containers and providing downwardly inclined, oppositely extending conduits, an abrasive cutoff valve connecting the outlet fitting on each container to the adjacent conduit whereby upon manipulation of said valves, abrasive may be selectively fed to either or both conduits, a plurality of abrasive feeding tubes connected to the lower sides of each conduit, a fluid pressure abrasive ejector connected to each feeding tube, means for connecting a discharge hose to each ejector, a moisture separator mounted on said apparatus, means for connecting a source of fluid pressure to the inlet of said separator, a fluid pressure manifold connected to the outlet of said separator and conduits connecting said fluid pressure manifold and each ejector whereby one or a plurality of said ejectors may be selectively utilized and whereby certain of said ejectors may be supplied with abrasive from either or both containers.

5. A portable abrasive containing and feeding apparatus comprising a chassis, ground engaging wheels on said chassis, means on said chassis for coupling the same to a towing vehicle, a supporting frame extending upwardly from said chassis, a pair of abrasive containers mounted on said frame, each container having a convex bottom wall, an outlet fitting secured to said bottom wall at the apex thereof, an inverted V-shaped abrasive manifold disposed beneath said containers and providing downwardly inclined oppositely extending conduits, an abrasive cutoff valve connecting the outlet fitting on each container to the adjacent conduit whereby upon manipulation of said valves, abrasive may be selectively fed to either or both conduits, a plurality of abrasive feeding tubes connected to the lower sides of each conduit, a fluid pressure abrasive ejector connected to each feeding tube, means for connecting a discharge hose to each ejector, a moisture separator mounted on said apparatus, means for connecting a source of fluid pressure to the inlet of said separator, a fluid pressure manifold connected to the outlet of said separator and conduits connecting said fluid pressure manifold and each ejector whereby one or a plurality of said ejectors may be selectively utilized and whereby certain of said ejectors may be selectively supplied with abrasive from either or both containers.

6. A portable abrasive containing and feeding apparatus comprising a chassis, ground engaging wheels on said chassis, means on said chassis for coupling the same to a towing vehicle, a supporting frame extending upwardly from said chassis, a pair of abrasive containers mounted on said frame, each container having a convex bottom wall, an outlet fitting secured to said bottom wall at the apex thereof, an inverted V-shaped abrasive manifold disposed beneath said containers and providing downwardly inclined, oppositely extending conduits, an abrasive cutoff valve connecting the outlet fitting on each container to the adjacent conduit whereby upon manipulation of said valves, abrasive may be selectively fed to either or both conduits, a plurality of abrasive feeding tubes connected to each conduit, a fluid pressure abrasive ejector connected to each feeding tube, means for connecting a discharge hose to each ejector, a moisture separator mounted on said apparatus, means for connecting a source of fluid pressure to the inlet of said separator, a fluid pressure manifold connected to the outlet of said separator and conduits connecting said fluid pressure manifold and each ejector whereby one or a plurality of said ejectors may be selectively utilized and whereby certain of said ejectors may be supplied with abrasive from either or both containers.

7. A portable abrasive containing and feeding apparatus comprising a chassis, ground engaging wheels on said chassis, a supporting frame extending upwardly from said chassis, a pair of abrasive containers mounted on said frame, each container having an outlet fitting secured thereto, an inverted V-shaped abrasive manifold disposed beneath said containers and providing downwardly inclined, oppositely extending condiuts, an abrasive cutoff valve connecting the outlet fitting on each container to the adjacent conduit whereby upon manipulation of said

valve abrasive may be selectively fed to either or both conduits, a plurality of abrasive feeding tubes connected to each conduit a fluid pressure abrasive ejector connected to each feeding tube, means for connecting a discharge hose to each ejector, a moisture separator mounted on said apparatus, means for connecting a source of fluid pressure to the inlet of said separator, a fluid pressure manifold connected to the outlet of said separator and conduits connecting said fluid pressure manifold and each ejector whereby one or a plurality of said ejectors may be selectively utilized and whereby certain of said ejectors may be selectively supplied with abrasive from either or both conduits.

8. A portable abrasive containing and feeding apparatus comprising a chassis, ground engaging wheels on said chassis, means on said chassis for coupling the same to a towing vehicle a supporting frame extending upwardly from said chassis, a pair of abrasive containers mounted on said frame, each container having an outlet fitting secured thereto, an inverted V-shaped abrasive manifold disposed beneath said containers and providing downwardly inclined, oppositely extending conduits, an abrasive cutoff valve connecting the outlet fitting on each container, to the adjacent conduit whereby upon manipulation of said valves abrasive may be selectively fed to either or both conduits, a plurality of abrasive feeding tubes connected to each conduit, a fluid pressure abrasive ejector connected to each feeding tube, means for connecting a discharge hose to each ejector, a fluid pressure manifold on said apparatus and conduits connecting said fluid pressure manifold and each ejector whereby one or a plurality of said ejectors may be selectively utilized and whereby certain of said ejectors may be selectively supplied with abrasive from either or both containers.

9. A portable abrasive containing and feeding apparatus comprising a chassis, ground engaging wheels on said chassis, a supporting frame extending upwardly from said chassis, a pair of abrasive containers mounted on said frame, each container having an outlet fitting secured thereto, an inverted V-shaped manifold disposed beneath said containers and providing downwardly inclined, oppositely extending conduits, an abrasive cutoff valve connecting the outlet fitting on each container to the adjacent conduit whereby upon manipulation of said valves, abrasive may be selectively fed to either or both conduits, a plurality of abrasive feeding tubes connected to each feeding tube, means for connecting a discharge hose to each ejector, a fluid pressure manifold on said apparatus and conduits connecting said fluid pressure manifold and each ejector whereby one or a plurality of said jectors may be selectively utilized and whereby certain of said ejectors may be selectively supplied with abrasive from either or both containers.

10. A portable abrasive containing and feeding apparatus comprising a chassis, ground engaging wheels on said chassis, a supporting frame extending upwardly from said chassis, a pair of abrasive containers mounted on said frame, each container having an outlet fitting secured thereto, an inverted V-shaped abrasive manifold disposed beneath said containers and providing downwardly inclined, oppositely extending conduits, an abrasive cutoff valve connecting the outlet fitting on each container to the adjacent conduit whereby upon manipulation of said valves abrasive may be selectively fed to either or both conduits, a plurality of abrasive feeding tubes connected to each conduit, a fluid pressure abrasive ejector connected to each feeding tube, means for connecting a discharge hose to each ejector and means for supplying fluid pressure whereby one or a plurality of said ejectors may be selectively utilized and whereby certain of said ejectors may be selectively supplied with abrasive from either or both containers.

References Cited in the file of this patent

UNITED STATES PATENTS

2,025,247	Rosenberger	Dec. 24, 1935
2,468,984	Krieg	May 3, 1949
2,594,072	Ridley	Apr. 22, 1952

FOREIGN PATENTS

298,633	Germany	June 18, 1917
969,490	France	May 24, 1950