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Champaigne

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(54) **MEDIA TRANSPORT DEVICE PROVIDING STABLE FLOW OF MEDIA**

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B24C 5/00 (2006.01)
B24C 7/00 (2006.01)

(52) **U.S. Cl.** **451/89**; 451/91; 451/99

(58) **Field of Classification Search** 451/75, 451/89, 90, 91, 92, 99, 102
See application file for complete search history.

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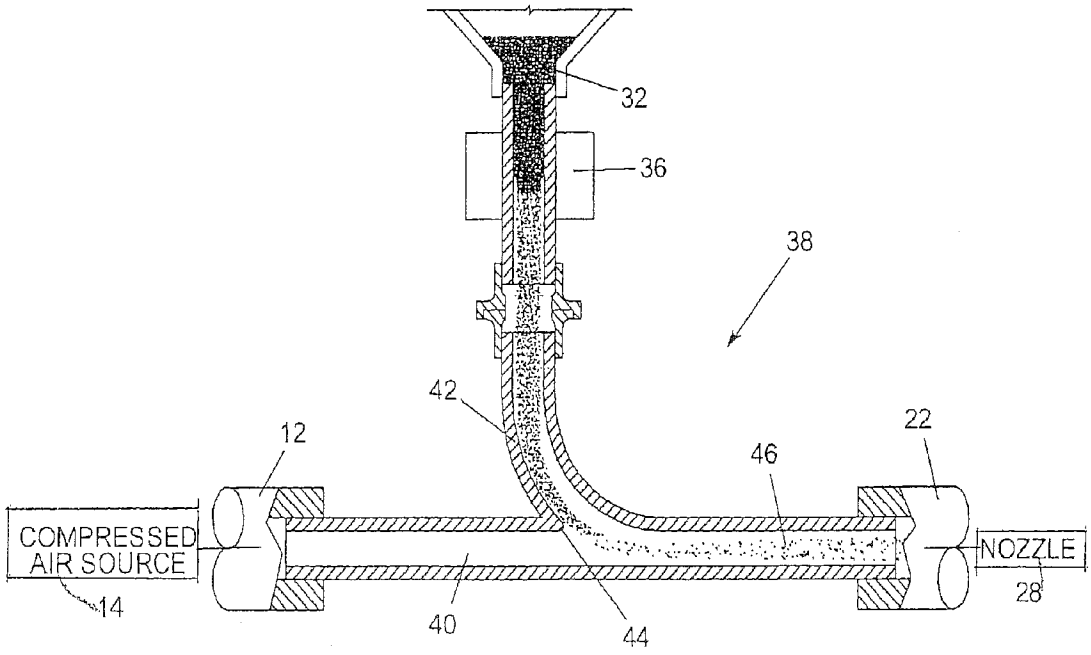
(57) **ABSTRACT**

A media transport device for use in shot peening, blast cleaning, granite cutting, and similar applications transports media from a storage hopper to a workpiece. The media transport device includes a source of compressed air, a supply hose connecting the compressed air source to a mixing chamber, and a blast hose connecting the mixing chamber to a nozzle dispensing the media onto a workpiece. The mixing chamber defines a flow path for the compressed air between the supply hose and the blast hose and includes an inlet portion connected to the supply hose, an outlet portion connected to the blast hose, and a curved dispensing portion conveying media from the storage hopper into the flow path obliquely with respect to the flow path so that laminar flow through the mixing chamber is not substantially disturbed. The inlet portion is of sufficient length to assure laminar flow of compressed air through the mixing changer before the media is introduced into the flow stream, and the outlet portion includes a section tapering to a diameter substantially equal to the inner diameter of the blast hose.

16 Claims, 4 Drawing Sheets



media more easily mixes with the flow stream and is less likely to drop out of the flow stream and accumulate in the mixing chamber, also as illustrated in FIG. **1**. By introducing the media obliquely, less disruption of the flow stream occurs, thus further assuring that flow through the mixing chamber remains laminar.

Because the flow through the mixing chamber **38** is laminar and because the media is mixed with the flow stream through the curved dispensing portion **42**, the discontinuities in flow due to the turbulent flow of the prior art are minimized. However, it will be noted in FIG. **2** that a change in diameter of the flow path does occur between the outlet portion **46** and the blast hose **22**. Accordingly, as shown in FIG. **3**, to eliminate this change in diameter and any turbulence introduced thereby, an insert **48** (which is shown in detail in FIG. **4**) is installed in the outlet portion **46** of the mixing chamber **38**. The insert **48** includes a tapered section **50** which has an initial diameter substantially equal to the inner diameter of the outlet portion **46** and tapers inwardly, terminating in a constant diameter portion **52**. The diameter of the constant diameter portion **52** is substantially the same as the inner diameter of the blast hose **22**, which is attached to the outlet portion **46** by a sleeve **54**, so that the inner diameter of the blast hose **22** is maintained in registry with the constant diameter portion **52** of the insert **48**. Accordingly, since all abrupt changes in diameter have been eliminated, laminar flow, once established in the relatively long inlet portion **40** of mixing chamber **38**, is maintained through the mixing zone where media is dropping through curved dispensing portion **42** is mixed with the flow stream, through the outlet portion **46**, and into the blast hose **22**.

The invention claimed is:

1. Media transport device for transporting media from a storage hopper to a workpiece comprising a source of compressed air, a supply hose connecting the compressed air source to a mixing chamber, a blast hose connecting the mixing chamber to a nozzle dispensing the media onto the workpiece, said mixing chamber defining a flow path for the compressed air between the supply hose and the blast hose and including an inlet portion connected to the supply hose, an outlet portion connected to the blast hose, and a curved dispensing portion connected with said storage hopper, said curved dispensing portion curving obliquely into said flow path from an orientation generally transverse to said flow path, whereby said curved dispensing porion curves from an orientation permitting media within the storage hopper to drop into and travel through said curved dispensing portion into said flow path until discharged from the curved dispensing portion into said flow path at an oblique angle with respect to the flow path to introduce media from the storage hopper into the flow path at an oblique angle with respect thereto whereby turbulence of compressed air communicated through said flow path caused by media introduced into the flow path is minimized.

2. Media transport device as claimed in claim **1**, wherein said inlet portion has a length sufficient to assure laminar flow of compressed air through the inlet portion.

3. Media transport device as claimed in claim **2**, wherein the length of the inlet portion is significantly longer than the diameter of the inlet portion.

4. Media transport device as claimed in claim **2**, wherein the length of the inlet portion is at least about ten times the diameter of the inlet portion.

5. Media transport device as claimed in claim **1**, wherein said outlet portion includes a tapered section terminating in a diameter substantially equal to the inner diameter of the blast hose.

6. Media transport device as claimed in claim **5**, wherein said tapered section is defined on an insert mounted in the outlet portion.

7. Media transport device as claimed in claim **6**, wherein the insert includes said tapered section and a constant diameter section extending from the tapered section to said blast hose.

8. Media transport device as claimed in claim **5**, wherein said tapered section registers with a constant diameter section, the diameter of said constant diameter section being substantially equal to the inner diameter of said blast hose.

9. Media transport device for transporting media from a storage hopper to a workpiece comprising a source of compressed air, a supply hose connecting the compressed air source to a mixing chamber, a blast hose connecting the mixing chamber to a nozzle dispensing the media onto the workpiece, said mixing chamber defining a flow path for the compressed air between the supply hose and the blast hose and including an inlet portion connected to the supply hose, an outlet portion connected to the blast hose, and a curved dispensing portion conveying media from said storage hopper into said flow path, said inlet portion being of sufficient length to assure laminar flow of compressed air through the mixing chamber before the media is introduced into the flow stream, said curved dispensing portion terminating at said mixing chamber for introducing said media obliquely with respect to said flow path so that the laminar flow through the mixing chamber is maintained.

10. Media transport device as claimed in claim **9**, wherein the length of the inlet portion is significantly longer than the diameter of the inlet portion.

11. Media transport device as claimed in claim **10**, wherein the length of the inlet portion is at least about ten times the diameter of the inlet portion.

12. Media transport device as claimed in claim **9**, wherein said outlet portion includes a tapered section terminating in a diameter substantially equal to the inner diameter of the blast hose, whereby laminar flow is maintained through said outlet section and into said blast hose.

13. Media transport device as claimed in claim **12**, wherein said tapered section registers with a constant diameter section, the diameter of said constant diameter section being substantially equal to the inner diameter of said blast hose.

14. Media transport device for transporting media from a storage hopper to a workpiece comprising a source of compressed air, a supply hose connecting the compressed air source to a mixing chamber, a blast hose connecting the mixing chamber to a nozzle dispensing the media onto the workpiece, said mixing chamber defining a flow path for the compressed air between the supply hose and the blast hose and including an inlet portion connected to the supply hose, an outlet portion connected to the blast hose, and a curved dispensing portion terminating at said mixing chamber conveying media from said storage hopper into said flow path, said inlet portion being of sufficient length to assure laminar flow of compressed air through the mixing chamber before the media is introduced into the flow stream, said outlet portion including a tapered section terminating in a diameter substantially equal to the inner diameter of the blast hose, whereby laminar flow is maintained through said outlet section and into said blast hose, and whereby turbulence of compressed air communicated through said flow path caused by media introduced into the flow path is minimized.

15. Media transport device as claimed in claim **14**, wherein said tapered section registers with a constant diam-

eter section, the diameter of said constant diameter section being substantially equal to the inner diameter of said blast hose.

16. Media transport device as claimed in claim **14**, wherein said dispensing portion curves from a generally vertical orientation permitting media to drop from said storage hopper into the dispensing portion to an orientation disposed oblique to said flow path whereby media is dispensed into said flow stream obliquely thereto to thereby maintain substantially laminar flow through the mixing chamber.

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