

Nov. 28, 1933.

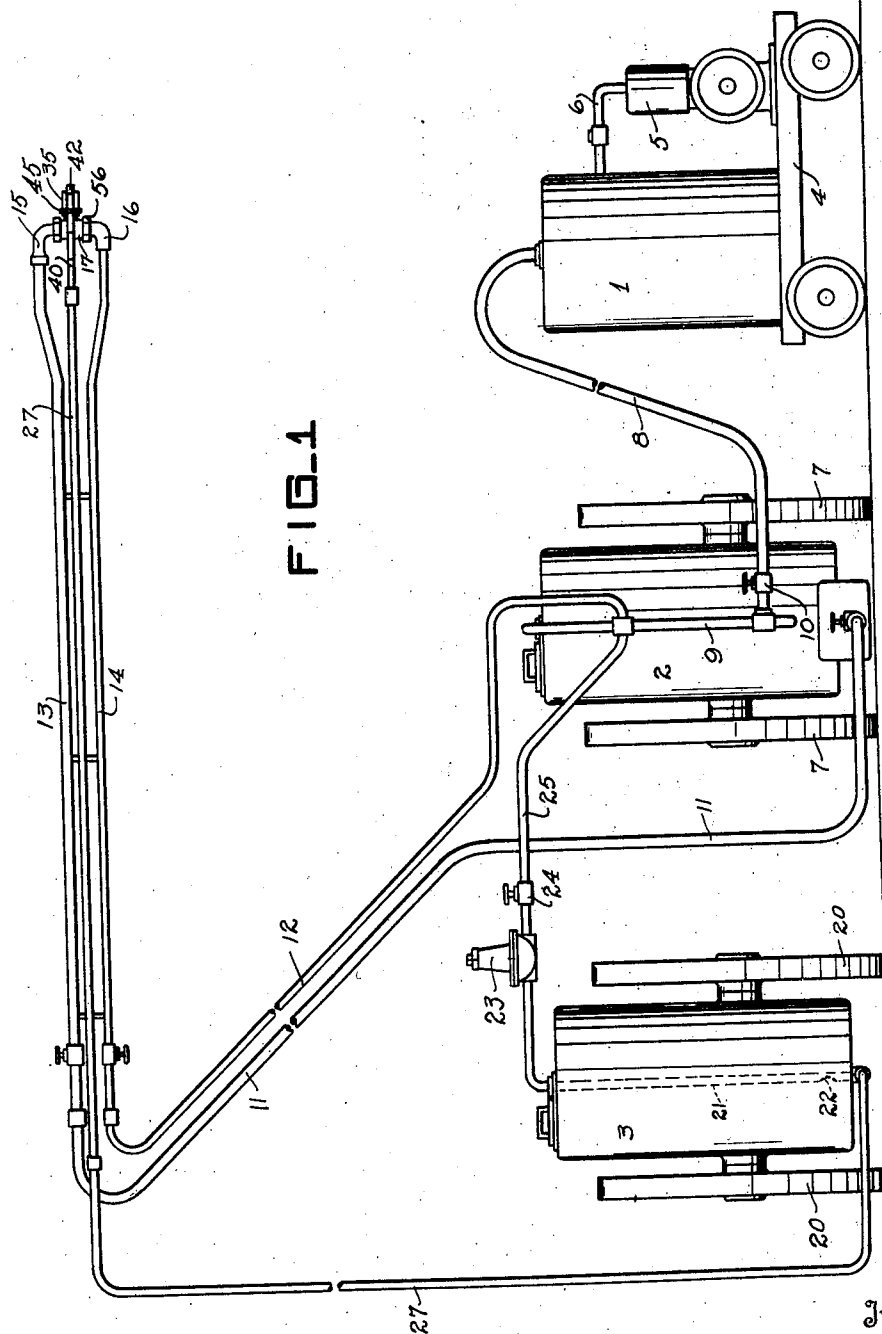
J. E. STRING

1,936,997

APPARATUS FOR COATING SURFACES

Filed March 30, 1929

2 Sheets-Sheet 1



Inventor

James Edward String,
By Ralph Golrick, *Treas*

Attorney

Nov. 28, 1933.

J. E. STRING

1,936,997

APPARATUS FOR COATING SURFACES

Filed March 30, 1929

2 Sheets-Sheet 2

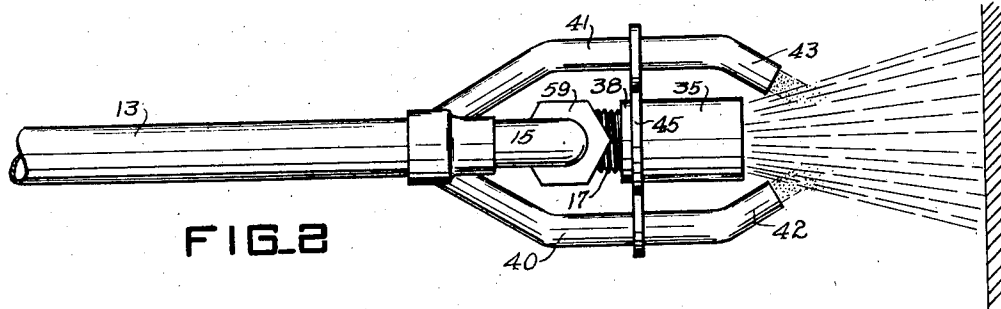


FIG. 2

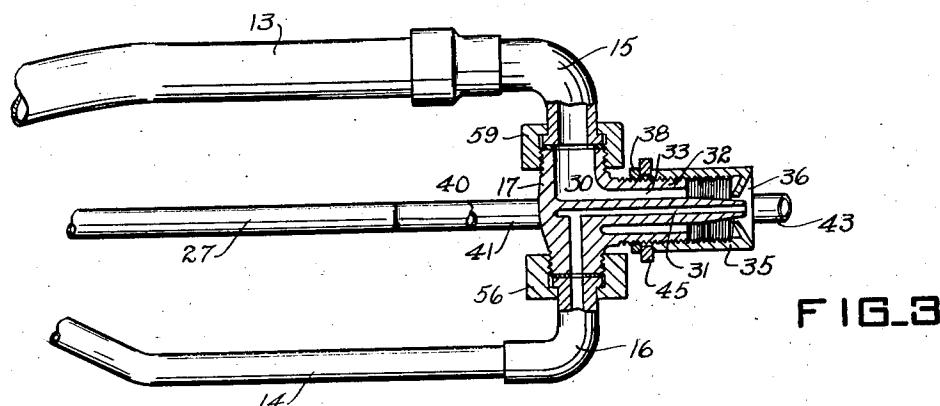


FIG. 3

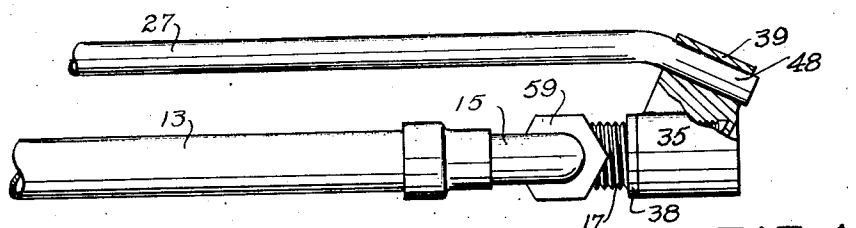


FIG. 4

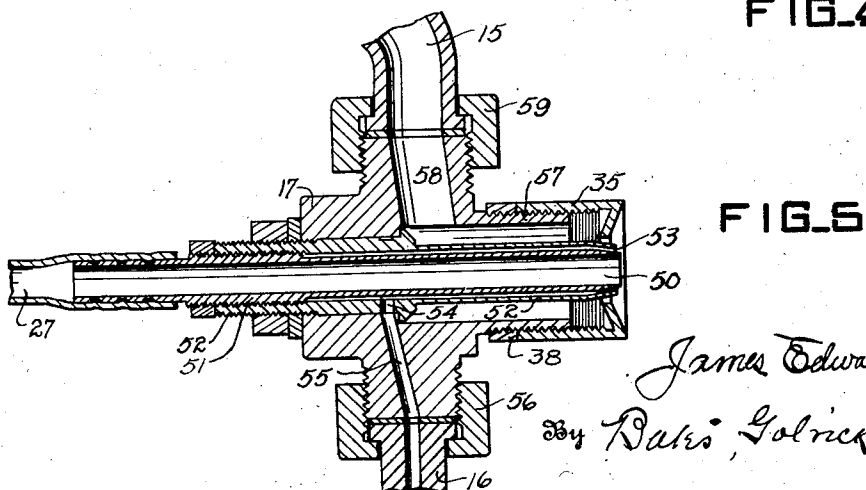


FIG. 5

Inventor

James Edward String,
By Davis, Golrick & Fear

Attorneys

UNITED STATES PATENT OFFICE

1,936,997

APPARATUS FOR COATING SURFACES

James Edward String, Cleveland, Ohio, assignor
to The Vortex Mfg. Co., Cleveland, Ohio, a
corporation of Ohio

Application March 30, 1929. Serial No. 351,244

5 Claims. (Cl. 91—45)

This invention relates to an apparatus for coating surfaces with a mixture of viscous material and grit for the purpose of waterproofing and dampproofing and filling voids. The material may be applied to various surfaces, as walls, ceilings, floors, columns etc. of masonry, concrete or other material, and besides its characteristic of thorough dampproofing and waterproofing, it may, if desired, form a key for a finish coating of plaster.

I have found that I can build up a coating of any desired thickness by spraying asphalt and grit simultaneously by means of an air blast which breaks up the asphalt and feeds the grit into it after it leaves the nozzle. In such application the grit serves to hold the various particles of asphalt together so that there is no running effect or tendency to separate. By directing the sprayed mixture to particularly low spots or large voids in the surface, they may be entirely filled, flush with the rest of the surface, and thereafter the continued application will give a coating of the desired thickness.

In spraying such a mixture, I have found it important to force air and asphalt (rendered liquid by a suitable solvent) to adjacent nozzle orifices so that the air may expand and break up the asphalt, and then to feed the said grit into such discharged broken up asphalt after its discharge from the nozzle but close thereto.

By way of illustration, and not as limiting myself thereto, I may say I have produced satisfactory results by using asphalt suspended in naphtha at a consistency approximating that of syrup, and by using sand of such size that all of it passes through a No. 30 screen and is all rejected on a number 60 screen, and I have satisfactorily applied such materials simultaneously by means of an air-blast-nozzle having concentric passage-ways for air and asphalt and a conduit for feeding the sand under air pressure forcibly into the expanded asphalt stream just after it leaves the nozzle. In such operation, I have satisfactorily employed an air pressure on the air line of about seventy pounds per square inch; on the asphalt tank also seventy pounds, and on the sand tank about thirty pounds.

Fig. 1 is a somewhat diagrammatic elevation of a complete coating apparatus embodying my invention; Fig. 2 is a view on a larger scale showing one form of combined air, asphalt and grit nozzle which may be employed; Fig. 3 is a central longitudinal section of the apparatus shown in Fig. 1, being in a plane at right angles to that figure; Fig. 4 is a sectional side elevation of a

modified form of combined air, asphalt and grit nozzle; Fig. 5 is a longitudinal central section of a still further modification of the combined air, asphalt and grit nozzle.

Referring first to Fig. 1, 1 designates a compressed air tank, 2 a container for liquid asphalt, 3 a container for the grit. The air container or tank 1 is shown as mounted upon the platform 4 of a suitable wheeled truck by means of which it may be moved about, and the platform 4 carries a suitable air pump or compressor 5 which is connected to the tank 1 by a pipe 6, by means of which air may be supplied to the tank and maintained therein at a given pressure. The pump or compressor 5 may be of any approved type driven by electricity, gasoline or other convenient power.

The container 2 for the coating material is shown as provided with carrying wheels 7 to permit it easily to be moved from place to place. In use it is connected to the compressed air tank 1 by a flexible hose or pipe 8. The hose 8 leads from the top of the tank 1 to a rigid pipe 9 mounted vertically on one side of the container 2 and having its upper end portion in communication with the top of the container, whereby compressed air is supplied from the tank 1 to the top of the container 2 above the level of the viscous coating material therein. The pipe or hose 8 is provided with a valve 10 to regulate the flow of air from the tank 1 to the container 2.

Leading from the bottom or lower portion of the container 2 is a flexible hose or pipe 11 for the coating material, and leading from the air pipe 9 is a flexible hose or pipe 12 for compressed air. These flexible pipes 11 and 12 extend from the container 2 and are connected to two parallel rigid pipes 13 and 14, respectively, which are secured together by suitable cross pieces to constitute a long rigid handle structure. The free end portions of the rigid pipes 13 and 14 are connected by opposed elbows 15 and 16 to a nozzle fitting 17 which carries the nozzle hereinafter described for delivering the coating material.

The sand which I employ is placed within a closed, airtight container 3 which is provided with carrying wheels 20 similar to the container 2, to permit it to be moved from place to place. Extending vertically through the container 3 and above and below the top and bottom thereof is a pipe 21 having an opening 22 in one side thereof affording communication between the lower portion of the container and the pipe and

through which the sand within the container may enter the pipe by gravity.

The upper end of the pipe 21 is connected (through a reducing valve 23 and shut-off-valve 24) to the compressed air pipe 9 on the container 2 by a flexible pipe or hose 25. The lower end of the pipe 21 is connected to a flexible pipe 27 which extends from the container 3 to the handle structure and is connected in parallelism rigidly with pipes 13 and 14 to form a part of the handle. This sand pipe discharges adjacent the air and asphalt orifices.

During the operation of the apparatus, the compressed air from the tank 1 passing through the pipe 21 encounters the sand entering the pipes through the opening 22 therein and carries the sand with it to and discharges it into the inflated stream of asphalt emitted from the nozzle, as about to be described.

As heretofore mentioned, the drawings illustrate three forms of combined air, asphalt and sand nozzles. Referring first to the form shown in Figs. 2 and 3, it will be seen that the air line 14 through the elbow 16 leads to a central passageway 30 formed in a tubular extension 31 of the nozzle fitting 17. Surrounding this passageway, this fitting has a sleeve portion 32 leaving an annular passageway 33 communicating with the elbow 15 and thus forming a conduit for the asphalt. A suitable cap 35 is threaded onto the exterior of the nozzle sleeve 32. This cap has a cylindrical wall and terminates in a dished end 36 having an opening somewhat larger than the air tube 31. The exterior of the air tube is tapered as shown in Fig. 3, so that by adjusting the cap in and out the effective size of the annular opening for the asphalt may be regulated. This adjustment is locked by a jamb nut 38.

In the embodiment of Figs. 2 and 3, the sand pipe 27 divides into two pipes 40 and 41 which diverge and then extend alongside of the air and asphalt passageways and terminate in converging discharge portions 42 and 43. These two sand pipes are properly spaced with reference to the air and asphalt nozzle by means of a brace plate 45 which is shown as surrounding the fitting sleeve 32 and clamped in place by the nozzle cap 35 and the jamb nut 38.

With the construction described, the sand coming through the two diverging pipes 42 and 43 enters the inflated stream of asphalt discharged from its nozzle by the air behind it and the central air blast, so that the sand becomes mixed with the asphalt between the nozzle and the structure to be treated. Thus the sand and asphalt are commingled before they strike the surface, and reach such surface as a unitary mastic. This mastic comes upon the surface with considerable impact and is forced into the interstices and openings of the surface by means of the force of the propelling air and the central air pressure. Accordingly, as the handle structure is moved back and forth, a coating of this thickened material is effectively applied to the structural surface until a layer of the desired thickness has been built up.

In the illustration shown in Fig. 4, the air and asphalt connections are as already described. The sand pipe 27 however in this instance is not bifurcated but passes as a single pipe to the inwardly directed portion 48 which is carried by an ear 39 on the nozzle cap 35. This is accordingly a somewhat simpler form of combined nozzle.

Fig. 5 illustrates a nozzle where the sand, air

and asphalt streams are concentric. In this case, the sand pipe 27 is connected to an axially aligned central nozzle pipe 50. This pipe has an enlarged hub externally threaded at 51 and on this is mounted a sleeve 52 which continues close to the tube 50 to provide a narrow annular air passageway discharging at 53. This annular space is connected by an opening 54 with a passageway 55 in the nozzle fitting 17 which is coupled by a suitable coupling 56 with the elbow 16 which leads from the air pipe 14 as heretofore. The nozzle fitting 17 is formed with a sleeve portion 57 which surrounds the air pipe 52 at some distance therefrom and provides the annular asphalt passageway. This is connected by a passageway 58 in the fitting 17 which leads to the elbow 15 coupled to the fitting at 59, and thence to the asphalt pipe 13 as heretofore. The fitting sleeve 57 is externally threaded to receive the usual internally threaded cap 35 constructed as already described.

By the employment of such apparatus as described, one can efficiently and rapidly deliver to the surface, and impact upon it, a mastic which not only fills the breaks, interstices and even the small pores but is of consistency that a layer may be built up of any desired thickness. I can thus effectively treat walls formed by masonry, concrete, cinder blocks and other similar surfaces, which heretofore have resisted successful waterproofing and dampproofing. My applied mastic is so compact and permanent that it may well be left as the final wall coating. However, I have found that a structural surface coated with this viscous material and sand as hereinbefore described, will receive and permanently retain plaster, stucco and similar materials without danger of cracking or separation from the base.

I claim:—

1. The combination with a container for viscous material, a container for inert thickening material, means for supplying air pressure to the two containers, discharge conduits from the containers and a combined three-part nozzle in communication respectively with the two tanks and with an air supply, said nozzle having an annular passageway for viscous material and a passageway for air within said annular passageway, the annular passageway being bounded by an external adjustable cap having an opening into which the air passageway extends and a conduit for the inert material under pressure so positioned as to discharge such material forcibly into the expanding stream of viscous material and air after such stream leaves the nozzle.

2. A nozzle comprising a body having a central tubular portion and an annular wall about the tubular portion spaced from it, elbows connected with the central tubular portion and the annular space, a cap screwing onto the annular wall and having an end opening cooperating with the central tube to make an adjustable discharge for the material in the annular space, a brace clamped on the body by a cap and a suitable nut, a pair of external tubes diverging from a common tubular supply passing on opposite sides of the cap and held by said brace and adjacent their free ends bent inwardly to discharge into the material emitted from the central tube and annular nozzle.

3. In a device for applying mastic, the combination with means for separately carrying compressed air, liquid asphalt and grit, of a central compressed air nozzle, an annular nozzle for liq-

uid asphalt surrounding the compressed air nozzle and discharging adjacent the air discharge, means for supplying liquid asphalt under pressure to said annular nozzle, a plurality of inwardly deflected tubes with unrestricted orifices leading from a common sand pipe and lying outside of the asphalt nozzle and converging beyond the same and means for forcing grit under pressure through said pipe and tubes to forcibly discharge grit into the expanded stream of air and asphalt.

4. In a compound nozzle for applying mastic, the combination of a central discharge nozzle, means providing an annular passageway about said central nozzle, a cap having a threaded connection with the outer end of said means providing the annular passageway, said cap being adjustable longitudinally of the nozzle, there being

an opening in the head of the cap adjacent the nozzle, and an external tube of uniform bore held in fixed relation to the nozzle and converging toward the combined stream discharged from the nozzle and annular passageway and having an orifice adapted to discharge a stream of sand into said combined stream.

5. A nozzle for applying mastic to a surface comprising an annular discharge passageway for viscous material, an air passageway within the said annular passageway, whereby the viscous material may be expanded by air pressure within it, and a passageway for grit directed adjacent the orifice so as to discharge into the expanded viscous material in the atmosphere after it leaves the nozzle, and pneumatic means for propelling the substances along the respective passageways.

JAMES EDWARD STRING.

20	95
25	100
30	105
35	110
	115
45	120
50	125
55	130
60	135
65	140
70	145
75	150