

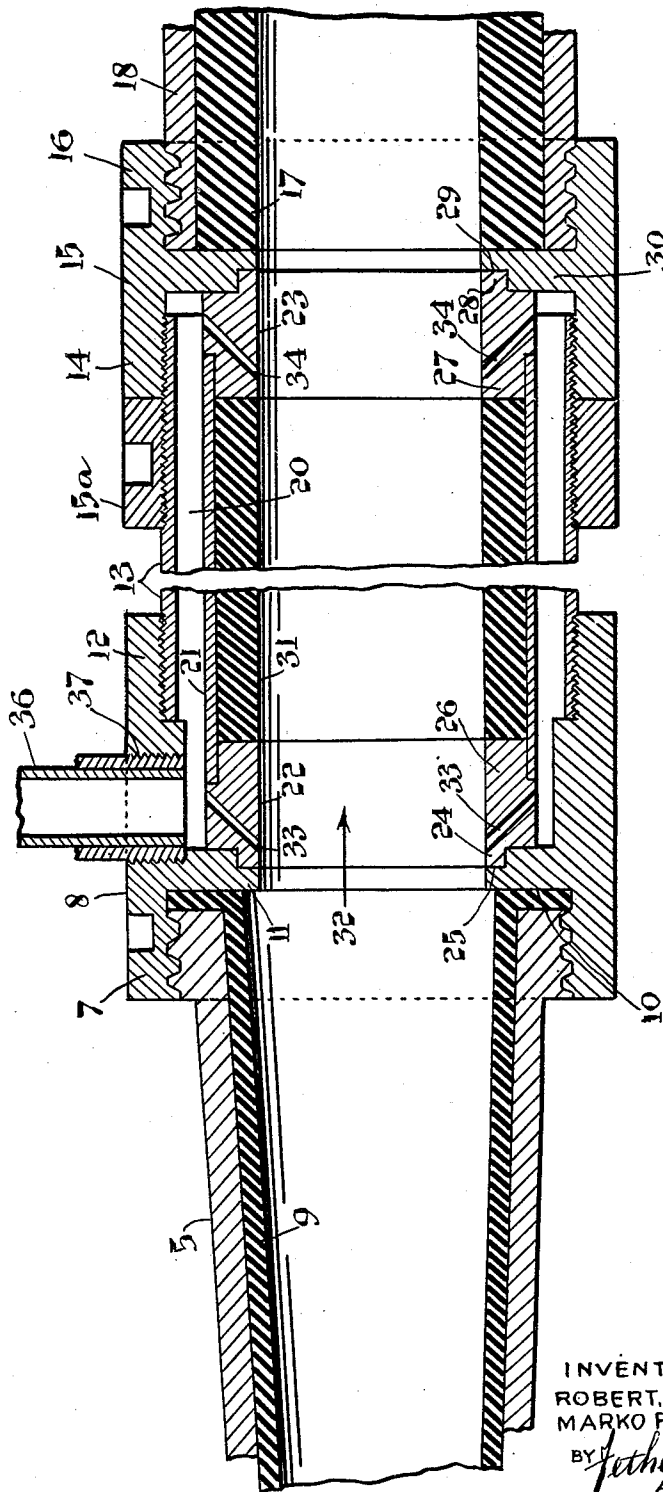
July 25, 1950

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2,516,684

PNEUMATIC CEMENT-APPLYING APPARATUS

Filed Dec. 11, 1947



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2,516,684

PNEUMATIC CEMENT-APPLYING
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Application December 11, 1947, Serial No. 791,064

2 Claims. (Cl. 259—151)

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This invention relates to pneumatic cement-applying apparatus in which compressed air is utilized to "shoot" a hydrated mixture of sand and cement aggregate through a nozzle onto the surface to be covered. In the conventional apparatus of this type the aggregate is supplied to the nozzle through a flexible hose and the total amount of water required for hydration is introduced through a water ring located at or near the point where the aggregate enters the nozzle.

In U. S. Patent 2,392,408, granted Jan. 8, 1946, there is described an improved pneumatic cement-applying apparatus wherein improved hydration of the aggregate and other advantages are obtained by the provision of a rear water ring through which part of the total amount of water required for hydration is added to the aggregate at a point located an appreciable distance in advance of the point where the aggregate enters the nozzle, the balance of the required amount of water being added through a front water ring located at or near the point of entry of the aggregate into the nozzle. In this apparatus the front and rear water rings are connected to separate branches of a water supply pipe. These branches are equipped with valves which are adjusted by the operator to predetermine the proportion of the required amount of water added to the aggregate at each ring. The best results are obtained when the valves are accurately adjusted so that approximately one-third of the total amount of water required for hydration is added at the rear water ring and the balance added to the aggregate at the front water ring.

Efficient operation of the apparatus described in said prior patent requires accurate proportioning of the relative amounts of water supplied to the aggregate through the front and rear water rings and experience has shown that the adjustments necessary to accomplish this cannot safely be left to the judgment or guesswork of the operator. Different aggregates require different amounts of water for efficient hydration and it takes considerable time for a skilled operator using the apparatus described in our prior patent to acquire the skill and judgment necessary to operate the water supply valves to provide the adjustments necessary to ensure for different conditions of operation, the required accurate proportionate distribution of the water between the front and the rear water rings. Because of this it sometimes happens that the potential efficiency of operation of the apparatus described in our prior patent is not realized in practice ow-

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ing to incorrect setting of the water supply valves.

Another undesirable feature of the apparatus disclosed in said prior patent is the existence of a differential pressure between the front and rear water rings which adversely affects the accurate proportioning of the water between the two rings and also tends to reduce the pressure on the rear ring with resulting plugging of the orifice of this ring and subsequent loss of time and faulty operation.

With the foregoing in mind one object of the present invention is to provide an improved pneumatic cement-applying apparatus in which the proportionate distribution of water between the front and rear water rings is automatically taken care of in a foolproof manner.

Another object of the invention is to provide an improved pneumatic cement-applying apparatus in which provision is made for maintaining identical water pressure conditions on each of the front and rear water rings.

Other objects, advantages and characteristic features of the invention will be more readily understood from the following description of the accompanying drawings illustrating what we now conceive to be the preferred embodiment of our invention.

In these drawings:

The single figure is a longitudinal sectional view of a pneumatic cement-applying apparatus embodying our invention.

Referring more particularly to the drawing, 5 designates a nozzle through which the hydrated sand and cement aggregate is projected onto the surface to be covered. The rear end of the nozzle is screwed into the internally threaded front end 7 of a ring-shaped nozzle coupling 3. A rubber liner 9 is arranged in nozzle 5 and is provided, at its rear end, with an outwardly directed sealing flange 10 clamped between the rear end of the nozzle and the front side of an annular flange 11 extending inwardly from an intermediate portion of coupling 3.

The rear end portion 12 of coupling 3 is internally threaded and screwed onto the front end of a metal tube 13. The rear end of tube 13 is screwed into the internally threaded front end portion 14 of a ring-shaped hose coupling 15 having an internally threaded rear end portion 16 in which the delivery end of a flexible hose 17 is secured by an externally threaded fitting 18. Coupling 15 is machined to make a running fit on tube 13 to permit convenient removal of coupling 15 and other interior parts of the complete as-

sembly hereinafter described. Coupling 15 is locked in place by locknut 15a.

Couplings 8 and 15 serve, in conjunction with tube 13, to provide the outer and end walls of a water jacket 20 whose inner wall is formed by an inner tube 21 and front and rear water rings 22 and 23.

The front water ring 22 is machined to provide a front spigot portion 24 of reduced diameter which is a press fit in a recess 25 provided in the rear side of coupling flange 11. The rear portion of water ring 22 is similarly machined to provide a rear spigot portion 26 which is a press fit in the front end of tube 21. The rear water ring 23 is similarly machined to provide a spigot portion 27 which is a press fit in the rear end of tube 21 and a second spigot portion 28 which is a press fit in a recess 29 provided in an annular flange 30 projecting inwardly from an intermediate portion of the hose coupling ring 15.

A tubular rubber liner 31 is cemented to the inside of tube 21 so that it extends the full distance between the front and rear water rings 22 and 23. The inner circumferential surfaces of front and rear water rings 22 and 23 are flush with the inner circumferential surface of liner 31 and form therewith a smooth tubular passage 32 through which the sand and cement aggregate is forced from the delivery end of the hose 17 to and through the nozzle 5.

Front water ring 22 is pierced by holes 33 through which water is delivered from water jacket 20 to the sand and cement aggregate at approximately the point where the aggregate enters nozzle 5. Rear water ring 23 is provided with similar holes 34 through which water is delivered from the water jacket to the sand and cement aggregate at points located an appreciable distance in advance of the point of entry of the aggregate into nozzle 5.

The number and/or size of the holes 33 and 34 provided in the front and rear water rings 22 and 23 is predetermined so that the water is metered to give the correct proportionate distribution between the two water rings. The arrangement and/or size of the holes in the two rings is preferably predetermined so that approximately one-third of the total amount of water required for hydration is delivered through the holes 34 of rear water ring 23 and the balance through the holes 33 of front water ring 22.

The provision of the common water jacket 20 through which the water is delivered to both water rings ensures the maintenance of identical water pressure conditions at each ring and is an important factor in maintaining accurate relative proportioning of the amount of water supplied to the aggregate through said rings.

The holes 33 and 34 of water rings 22 and 23 are preferably inclined, as shown, so that the water flowing through these holes is directed in the direction of flow of the aggregate through the water rings.

Water under pressure may be supplied to water jacket 20 in any suitable manner. In the present instance we have shown a water supply hose 36 having its delivery end screwed into a water inlet opening 37 provided in the nozzle coupling 8 at the rear side of flange 11.

Another advantage of the present invention is that it provides a self-contained hydration unit which is lighter in weight than the equivalent arrangement described in our prior patent and which is composed of parts which are accurately machined to ensure tight joints in the assembled relation thereof and which can be assembled and disassembled with great ease and rapidity.

Having thus described the nature of our invention and a preferred embodiment thereof, it will be understood that various modifications may be resorted to within the scope and spirit of the invention as defined by the appended claims.

We claim:

1. In pneumatic cement applying apparatus of the character described, a hydration unit comprising front and rear centrally apertured end members each having internally threaded front and rear end portions and an inwardly directed intermediate annular flange, an outer tube having its front and rear ends screwed, respectively, into the internally threaded rear end of the front end member and the internally threaded front end of the rear end member, said tube forming, with said end members, the outer and end walls of a water jacket, separately formed front and rear water rings butted, respectively, against the rear side of the flange of the front end member and the front side of the flange of the rear end member so that said rings form end portions of the inner wall of the water jacket, an inner tube connecting said water rings and forming an imperforate intermediate portion of the inner wall of the water jacket, said rings being pierced by openings extending from the outer to the inner circumference thereof and providing water passages through which water is discharged from the water jacket into the space surrounded by said rings, means for supplying water under pressure to said water jacket, an aggregate supply conduit screwed into the internally threaded rear end of said rear end member and a nozzle screwed into internally threaded front end of said front end member.

2. Pneumatic cement applying apparatus as set forth in claim 1, in which the water rings are provided with end portions of reduced external diameter fitted in the ends of said inner tube and opposite end portions of reduced external diameter fitted in recesses provided in the flanges of said end members and in which the inner portion of the inner tube lying between said water rings is covered by a resilient non-metallic tubular liner having its inner annular surface flush with the inner annular surfaces of said water rings.

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