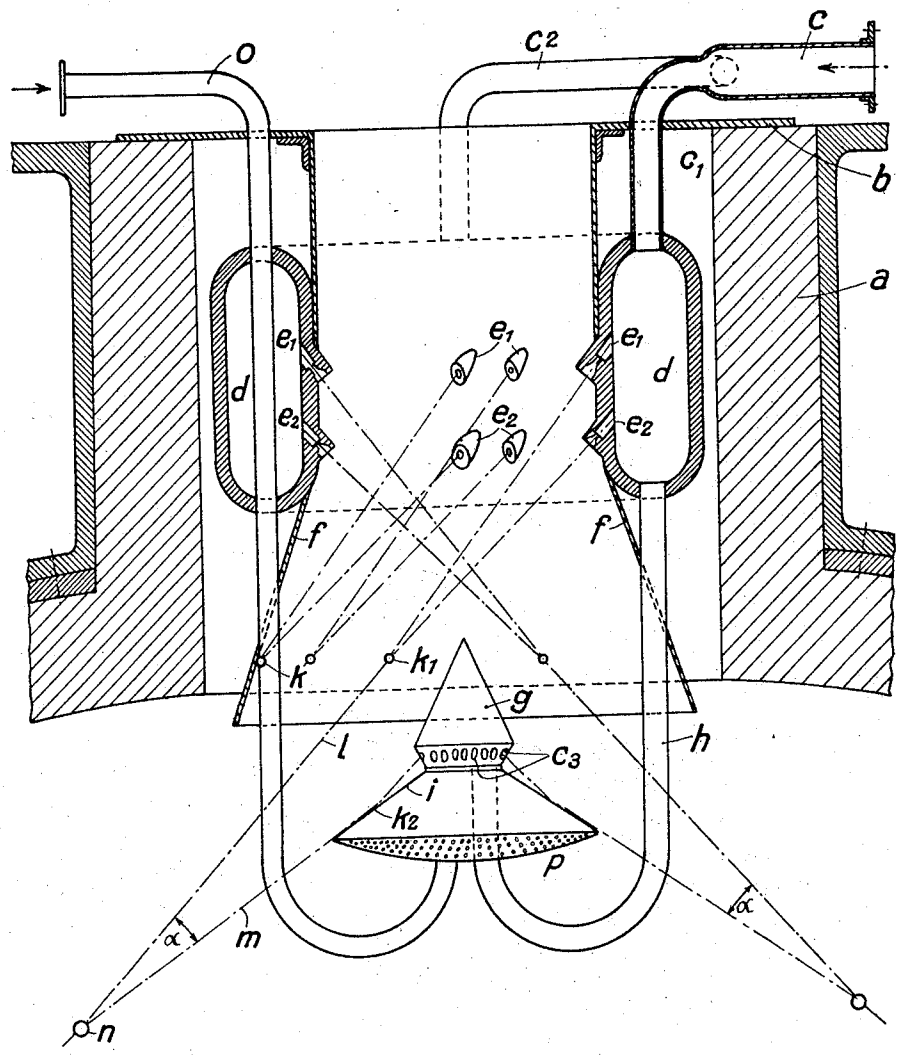
July 7, 1931. W. SCHOLZ ET AL 1,813,205

DEVICE FOR CHARGING VESSELS

Filed Sept. 24, 1930



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Patented July 7, 1931 1,813,205

UNITED STATES PATENT OFFICE

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DEVICE FOR CHARGING VESSELS

Application filed September 24, 1930, Serial No. 484,220, and in Germany May 30, 1928.

Our invention relates to apparatus or devices for charging vessels or receptacles and more particularly to an apparatus for charging a boiler with a comparatively light, voluminous material, such as wood-chips and the like, with the aid of a pressure agent such as pressure air or steam.

The operation of charging a large vessel with a voluminous material to be deposited therein is very wearisome if the material is allowed to deposit and settle in the vessel due to gravity only, and satisfactory results cannot be attained in this way, especially not in case of a bulky material such as wood-chips used for manufacturing cellulose therefrom.

We are aware that it has been suggested heretofore to improve the compacting of material of the kind in question by subjecting it to the action of currents of pressure air or even steam, however with limited effect only.

This invention has for its object to improve the effect of the application of pressure air or steam in charging vessels.

To this end in accordance with the present invention the currents of a pressure medium such as steam, compressed air or a suitable liquid for instance water are emitted through nozzles adapted to largely convert the pressure energy into velocity, two groups of nozzles being provided, the one encircling the charging conduit and the current of material passing therethrough and the other at a centrally positioned member. The high speed currents emitted from such nozzles communicate their energy to the particles of material, and cause the material to be deposited over the whole cross section of the receptacle.

An embodiment of the invention is illustrated in the accompanying drawing and shall be described as representing an axial section through the charging orifice of a cellulose boiler, it being however understood, that the invention is not limited to this special kind of use.

a designates the neck of the boiler forming a cylindrical orifice into which the charging apparatus is inserted so as to be suspended by an annular flange *b* provided at the upper end of the apparatus and supported by the annular top surface of the neck *a*. A conduit *c* serves for the admission of steam under pressure. The conduit *c* is branched to form a plurality of branch pipes whereof only two, c_1 and c_2, are shown in the drawing, the said branch pipes communicating with a closed annular tube or container *d* so as to discharge the steam therein. The inner wall of the annular tube or container *d* is provided with two superposed ranges of nozzles e_1 and e_2 respectively, constructed and shaped to ensure the pressure force or energy of the discharged steam to be converted, as completely as possibly can be attained, into velocity of the flowing steam. *f* indicates a hollow baffle wall or surface in the form of a truncated cone firmly connected with its apex and to the annular tube or container *d*. It will be seen that the nozzles e_1 and e_2 are so located, with relation to the baffle cone *f*, that the steam jets ejected from the former will impinge upon the latter.

Centrally mounted in the charging neck so as to project therefrom towards the bottom of the vessel, is a hollow member or insert *g* of the particular construction and shape as shown, connected for communication with the annular tube or container *d* by a curved pipe *h* discharging steam into the hollow member or insert *g*. The latter is provided with a set or system of nozzles e_3 disposed in a circular range. Fixed to the bottom of the hollow member *g* is a baffle wall or surface *i* shaped to form the frustrum of a hollow cone and so located with relation to the nozzles e_3 that the steam jets discharged by the nozzles e_3 will impinge upon the conical outer surface of the baffle element *i*.

In order that the action of the nozzles shown may be readily understood we have shown in the drawing, by dot-and-dash lines, a few steam jets ejected by the several ranges of nozzles e_1, e_2 and e_3. As illustrated on the drawing the steam jets discharged from or by two superimposed nozzles of the ranges e_1 and e_2 impinge upon the very same spot k_1 of the baffle cone *f*. The steam jets are reflected by the baffle surface and caused to take the direction indicated by the line *l*, while the

steam jets ejected by the nozzles e_3 of the hollow member g will impinge upon spots k_2 of the baffle cone i situated in a circular range about the cone i, and will be reflected to assume the direction indicated by the line m, so that the two reflected steam jets will meet at a point n.

It will be seen that in the preferred embodiment shown, the nozzles and baffle cones are arranged, with relation to each other, in a manner, that the angle formed by the meeting steam jets or lines l and m is a very acute one, and further it will be seen, that due to the fact, that the steam jets discharged by the two upper sets or ranges of nozzles intersect the steam jets emitted by the lower set or range of nozzles at predetermined points within the vessel, all of the wood-chips passing through the charging neck a will be grasped and caught by the steam jets and will be forced into and piled up in the vessel by a hammering action, so to say.

o designates part of a conduit for introducing treating lye, the conduit terminating at a sprinkling cone p. Apparently the lye discharged from the sprinkling head p will act to accelerate the condensation of the steam so that no undue inner or counter-pressure can prevail in the vessel.

The steam jets impinging upon the baffle cones f and i act with all of their energy to force any wood-chips along to the baffle surfaces, just as if they were shot down towards the bottom of the vessel, where they accumulate to form a compact layer of closely packed chips.

In the preferred embodiment of the invention shown in the drawing and provided with outer and inner ranges of nozzles, a chief advantage resides in the fact that the steam jets ejected by the nozzles with very high speed and with a large amount of inherent energy, do not only act in themselves as a propelling means on the material in its free fall, but by the baffle surfaces against which the material is thrown, find a better opportunity of grasping it vehemently and of transferring their energy onto the latter so that the material will be forced to move along the baffle surface with great velocity and to finally shoot the vessel down to the bottom thereof.

In order to attain this result in a best possible manner, it is important to give the steam jets ejected from the nozzles such a direction that they necessarily must impinge upon the baffle surfaces and that as the steam jets impinge upon the baffle surfaces, an intensive energy component directed towards the bottom of the vessel in parallelism to the baffle surface, will come to action. Consequently the baffle surface f provided for co-operation with the upper nozzles e_1, e_2 must be of conical shape and arranged as shown in the preferred embodiment illustrated in the drawing, while, from the like consideration, the baffle surface i for co-operation with the lower range of nozzles e_3 must be arranged as shown.

Obviously best results cannot be attained except when the steam is prevented from unduly accumulating in the vessel. To this end the conical springling head p is provided which will assist in removing any excess of live steam by accelerating the condensation thereof.

What we claim is:

1. A device for charging vessels with material of bulky character by means of jets of a pressure medium comprising two groups of nozzles adapted to largely convert the pressure energy of the currents of the pressure medium into speed, the one group of nozzles encircling the charging orifice and the second group of nozzles being arranged at the central part thereof.

2. In a device according to claim 1 the provision of a conical baffle member enlarging towards the bottom end and in such correlation to the outer group of nozzles that the jets of compressed medium impinge thereon and are reflected towards the interior of the vessel.

3. In a device according to claim 1 wherein the central group of nozzles peripherally surrounds a member positioned substantially coaxially to the charging orifice, such member being provided below said group of nozzles with a roof shaped surface in such correlation to the nozzles that the currents of the compressed medium emitted therefrom impinge thereon.

4. A device according to claim 1 in combination with a member positioned below said second group of nozzles and substantially coaxially to the charging orifice, the upper surface of said member being roof shaped and positioned in the path of the currents of the pressure medium emitted from the said second group of nozzles, the lower surface of said member being perforated to constitute a sprinkling head, and means for supplying a sprinkling liquid to the interior of said member.

In testimony whereof, we affix our signatures.

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