March 30, 1937. E. S. CANNON 2,075,093

DEVICE FOR PACKING CONCRETE AND THE LIKE

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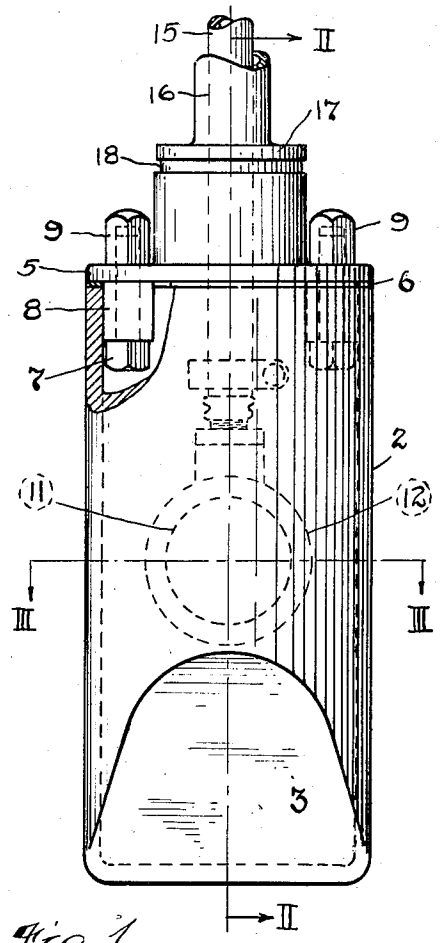


Fig. 1.

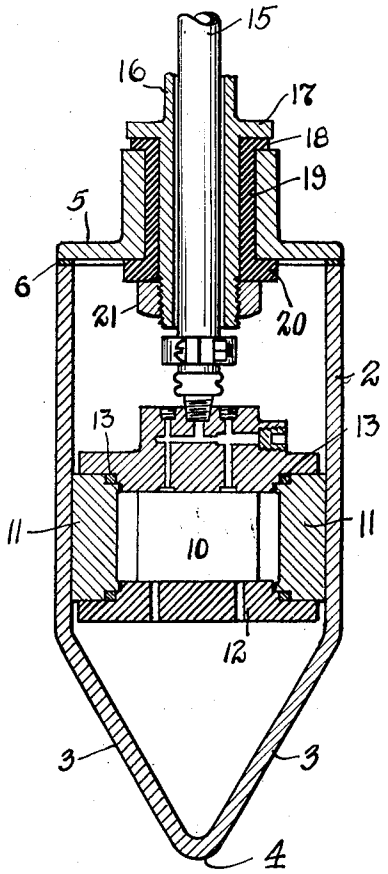


Fig. 2.

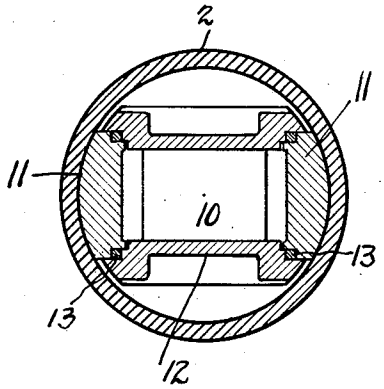


Fig. 3.

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DEVICE FOR PACKING CONCRETE AND THE LIKE

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5 Claims. (Cl. 259—1)

In the packing of concrete in forms, it has been a practice in many lines of work to apply vibrators to the outside of the forms. While this has certain advantages, it is open to the objection of not meeting requirements for internal uses, which are superior in mass placement of materials such as concrete. Attempts have been made to apply the vibratory action directly in the mass of the concrete by means of a rapidly rotating unbalanced weight, but this is subject to the limitation of too diffuse an action. A device capable of being immersed directly into the mass of concrete or other material being packed, and applying a direct hammer action in distinction to a diffuse rotary type vibration is accordingly of highly desired character, and particular importance in the art.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described and particularly pointed out in the claims, the following description and the annexed drawing setting forth in detail certain illustrative embodiments of the invention, these being indicative however, of but a few of the various ways in which the principle of the invention may be employed.

In said annexed drawing:—

Fig. 1 is a side elevational view of an embodiment of the invention, partly broken away; Fig. 2 is a sectional view taken on a plane substantially indicated by the line II, Fig. 1; and Fig. 3 is a transverse sectional view taken on a plane substantially indicated by the line III—III, Fig. 1.

Referring more particularly to the drawing, there is shown a casing 2 enclosing the entire operating mechanism and constituting an armored housing or container, being shaped also for immersion into the mass of the material, such as concrete, etc. to be packed. In general, the casing is of tubular form, and preferably cylindrical in its upper portion, and thence flattened or tapered to its lower extremity, presenting for instance the flattened faces 3, 3, terminating in a spade-point 4. Such casing is of suitable material, for instance steel, and its upper closure is provided in the form of a cap piece 5, this being secured to the casing 2 with an intervening gasket 6. For securing the cap piece to the casing, bolts 7 may be employed, these passing for instance through lugs 8 secured to the inner upper wall of the casing. A cap nut 9 is preferably employed to clamp the bolt 7, such construction more thoroughly excluding possible entry of material into the threads of the structure. Within the casing 2 is a reciprocable hammer. This may comprise a reciprocable piston 10 suitably provided with auxiliary ports whereby to valve the driving pressure fluid, for reciprocating movement of the piston. The detail structure as to this being immaterial, it is sufficient to here note that the inlet and exhaust proceeds through the upper end of the casing, and thus the device is enabled to operate irrespective of its immersion in a mass of material such as concrete. The reciprocable piston 10 is in relation at each end with an impact member 11, the assembly of piston and impact members being contained in general in a cylinder 12. Between the inner end of each impact member and the cylinder is a packing ring 13. With such construction, the reciprocable piston, when the pressure fluid, air for instance, is turned on, alternately strikes each impact member, and the latter contacting with the casing 2 directly imparts the hammer blow vibration to the concrete mass. By such construction, the casing 2 receives the blows, and also provides the material-penetrating shoe or spud directly passing the vibration blow into the material mass. At the same time, the holding of the elements in general assembly is taken care of, since the impact members 11 are without other means of holding than the surrounding casing 2, they thus being in position between the reciprocating piston 10 and the limiting wall of the casing.

For the passage of pressure fluid to the piston chamber, a hose connection 15 extends from a suitable source of pressure fluid, as for instance compressed air tank, and for convenience in handling and placement, a handle is provided. This may be the hose or a flexible handle or of tubular metal, as at 16. The handle is secured to the housing through the intermediary of a vibration-proof sleeve. A flange 17 on the handle 16 serves to engage the flange 18 of a rubber sleeve 19. A further flange 20, below, engages in turn against the inside of the casing cap 5, and a nut 21 screw-threadedly engaged on the lower end of the handle serves to tighten the latter in place in the head of the casing and also suitably hold the hose and the cylinder assembly supported thereby within the casing, yet independently of direct metallic fastening thereto. Space between hose 15 and handle 16 allows escape of exhaust fluid from the housing as discharged from the cylinder 12.

The manner of use of the device will be clear from the foregoing. The operator manipulating it by the handle 16 inserts it into the mass of concrete or material to be packed, and the pressure fluid being turned on by suitable valve at a point not shown, the piston 10 reciprocates,

striking the impact members 11 and communicating a hammer blow to the concrete mass through the housing 2. The line of motion being in general normal to the faces 3 of the housing-spud, a particularly effective transfer of hammer blow action is imparted to the concrete mass. Being conveniently portable, the device may be positioned at various points as desired, in accordance with the shape and extent of the work.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the means stated in any of the following claims, or the equivalent of such, be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. In apparatus of the character described, a fluid-reciprocated piston, an open-ended cylinder containing said piston, an impact-member in each end of said cylinder, a packing ring for each impact-member, and a casing about said cylinder unconnected thereto and maintaining assembly of said impact-member therein and externally having flattened material-engaging faces in orientation inclined to said reciprocated piston.

2. In apparatus of the character described, a fluid-vibrated hammer, a cylinder therefor, a casing thereabout for receiving the blows of said hammer and providing a material-penetrating shoe, and conduit means for suspending said cylinder in the casing and passing pressure-fluid through the upper end of said shoe, irrespective of its immersion in a concrete mass.

3. In apparatus of the character described, a fluid-vibrated hammer, a cylinder therefor, a tubular conduit communicating a source of pressure fluid to said cylinder, a casing about said cylinder providing a material-penetrating shoe, a flanged rubber sleeve between said conduit and said casing, and means for clamping said sleeve by its flange to the housing.

4. In apparatus of the character described, a fluid-vibrated hammer, a cylinder therefor, a tubular conduit communicating a source of pressure fluid to said cylinder, a casing about said cylinder providing a concrete-penetrating shoe, a cap closing said casing, a rubber sleeve between said conduit and said cap having a flange under said cap, and a clamping nut on the lower end of said conduit clamping the flange against the cap.

5. In apparatus of the character described, a fluid-reciprocated piston, a cylinder therefor, an impact member in each end of said cylinder, a casing about said cylinder holding said impact-members therein and externally shaped as a material-penetrating spud, a cap for closing said casing, a tubular conduit communicating a source of pressure fluid to said cylinder, a flange on said conduit above said cap, a rubber sleeve between said cap and said conduit having a flange under said conduit-flange and a flange under said cap, and a nut screw-threadedly engaging said conduit for clamping the flanges of said sleeve in assembly with said cap.

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