

Dec. 19, 1939.

B. C. COLLIER

2,183,547

APPARATUS FOR PLACING CEMENTITIOUS MATERIAL

Filed Oct. 26, 1938

2 Sheets-Sheet 1

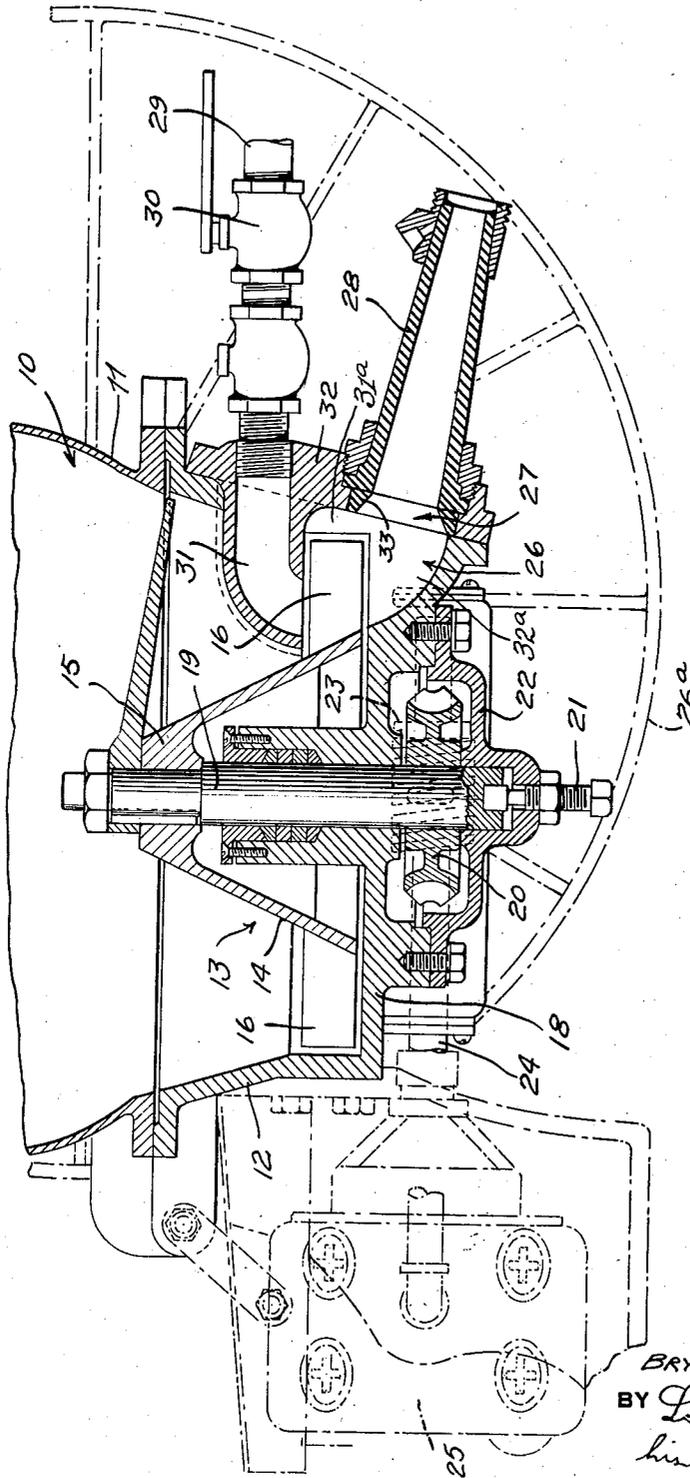


Fig. 1.

INVENTOR  
BRYAN C. COLLIER.  
BY *Louis L. Ansett*  
his ATTORNEY

Dec. 19, 1939.

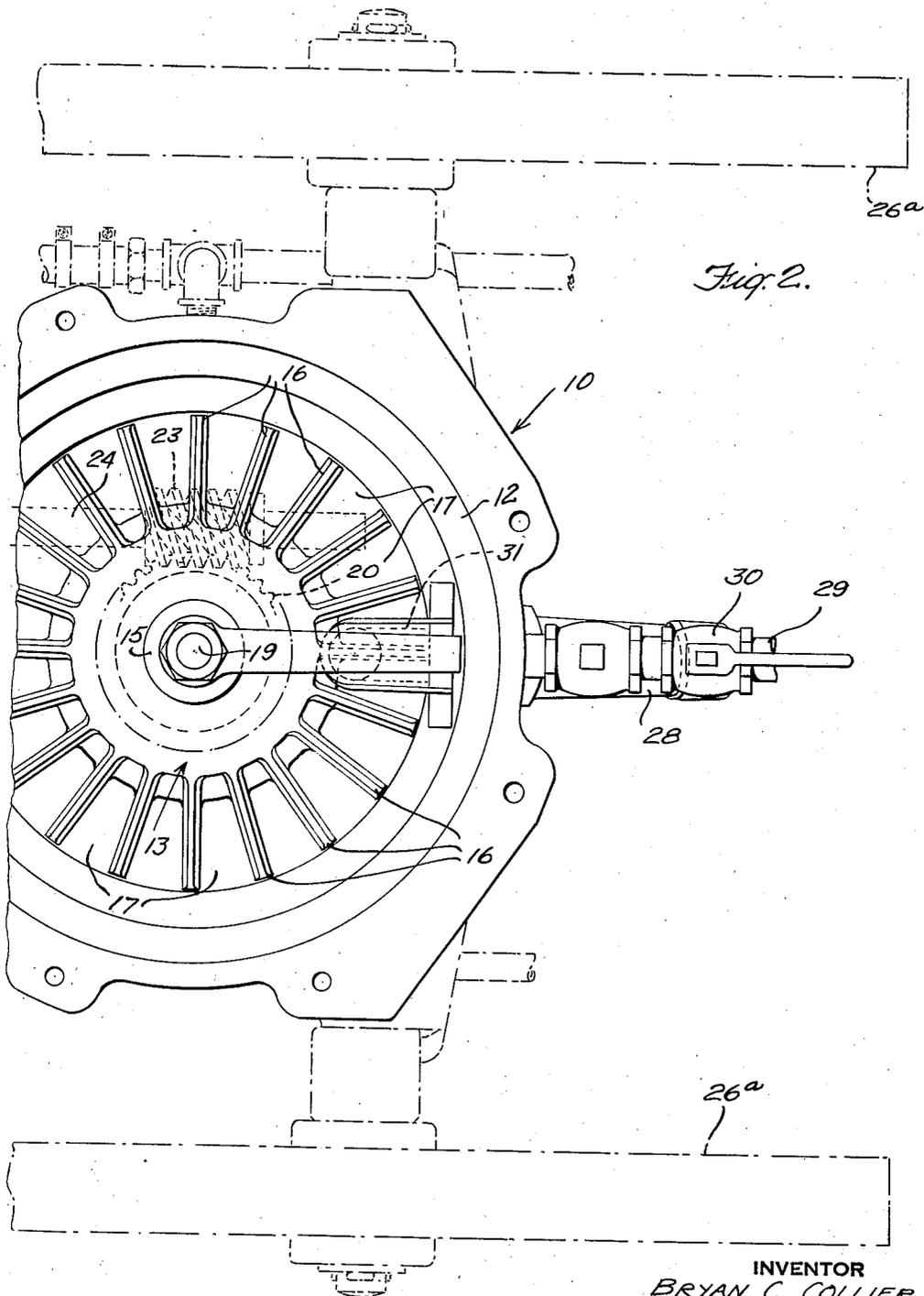
B. C. COLLIER

2,183,547

APPARATUS FOR PLACING CEMENTITIOUS MATERIAL

Filed Oct. 26, 1938

2 Sheets-Sheet 2



INVENTOR  
BRYAN C. COLLIER  
BY *Louis L. Ansart*  
his ATTORNEY

# UNITED STATES PATENT OFFICE

2,183,547

## APPARATUS FOR PLACING CEMENTITIOUS MATERIAL

Bryan C. Collier, Allentown, Pa., assignor to Cement Gun Company, a corporation of Delaware

Application October 26, 1938, Serial No. 237,073

2 Claims. (Cl. 302-49)

The present invention relates to improvements in apparatus for placing cementitious material, and more particularly to improvements in a "cement gun."

In using a "cement gun", such as is now in general use, it is the general practice to supply thereto cement and sand in suitable proportions and, by means of compressed air, discharge the mixture through a hose having a nozzle in which enough water is introduced to hydrate the cement in the mixture without addition of any substantial excess of water or moisture. From the nozzle the hydrated mixture is blown against a fixed surface of suitable shape. The sand in the mixture serves to tamp the material as it is placed and the dense and strong material thus produced is termed "Gunite." It should be understood, however, that other material may be used in the apparatus and that the product may be varied.

In the patent to Crom, No. 1,494,669, May 20, 1924, there is illustrated the lower part of a "cement gun" of a type heretofore in general use. In this apparatus the material in the lower chamber or receptacle is fed to the point for discharge by a feed wheel revolving about an upright axis and comprising circumferentially arranged pockets between radial blades projecting from the base of a central or hub portion in the general form of a cone but provided just above the upper edges of said blades with a shelf so that the portion of the cone below the shelf is, at all levels, of larger diameter than it would otherwise be and the pockets are shorter in the radial direction, thus producing pockets of relatively small capacity.

As the feed wheel turns, the pockets are brought in succession beneath a downturned end of a radially arranged nozzle or gooseneck through which a stream of compressed air is supplied to blow material out of a pocket below the nozzle and through an outlet in the receptacle and a hose to a suitable nozzle where water may be added to hydrate the mixture. The nozzle over the feed wheel receives air at its outer end and has an opening in its lower side and extending to the inner end of the nozzle, the inner end of the nozzle extending over said shelf and the upper wall of said nozzle being curved downwardly and slightly rearwardly so that the stream of compressed air will be turned downwardly and slightly outwardly to direct the material downwardly along the conical surface at the inner ends of the blades and outwardly towards the outlet which is substantially at the

same level as the pockets. With this arrangement the stream of air is turned back through almost 180°. This would tend to prevent a smooth flow of the compressed air and to cause an undue swirling of the solid material.

An important object of the invention is to provide improvements in apparatus of the class described whereby such disadvantages will be obviated.

Another object of the invention is to provide an arrangement whereby the material will tend to flow smoothly down to and through the feeding device and to the outlet of the receptacle.

A further object of the invention is to provide an arrangement whereby the stream of compressed air, which blows out of the apparatus material brought into its path, will pass smoothly through the apparatus.

According to one form of carrying out the invention, there is a central conical part of the feed wheel and there are circumferential pockets at the base of the feed wheel between radial blades extending to the wall of the receptacle. In this form there is no shelf adjacent to the tops of the blades thus enabling the material to flow smoothly down the surface of the cone and into the pockets. The passage at the base of the machine beneath the feed wheel is so shaped and located as to guide the air stream and material therein smoothly to the outlet, the material tending to fall directly from the pockets into the passage.

Further objects, features and advantages will be apparent upon consideration of the following detailed description and of the drawings in which:

Fig. 1 is a fragmentary vertical section of the lower part of a machine embodying the present invention; and

Fig. 2 is a fragmentary plan view of the lower part of the machine, the upper part being removed.

Referring to the drawings, it will be seen that the illustrative form of apparatus embodying the present invention comprises a receptacle 10 which may have a main portion 11 resting on a lower or base portion 12 in which a feed wheel 13 is mounted for rotation about the axis of the receptacle. Obviously the division of the receptacle into parts in this way facilitates manufacture, repair and replacement. Preferably, the feed wheel 13 comprises a conical wall 14 provided at its top with a hub 15 through which the feed wheel may be supported and rotated, and at its bottom with radial blades 16 providing

pockets 17 therebetween closed at the outer ends of the blades 16 by the inner surface of the base portion except at one location where material is to be discharged from the receptacle and closed at their bottoms by the bottom 18 of the receptacle except at the location where material is discharged.

The hub 15 may be mounted on a reduced upper end of a shaft 19 and connected thereto in any suitable manner so as to rotate therewith. The shaft 19 is rotatably mounted in a bearing carried by the bottom 18, leakage of compressed air along the shaft being prevented by suitable packing. The shaft 19 may be driven by means including a worm wheel 20 suitably connected thereto beneath the bottom 18. For example, the shaft 19 may be slidable through the worm wheel 20 and may be supported at its lower end by means including a screw 21 mounted in a member 22 secured to the bottom 18 in such a manner as to support the worm wheel 20 and also provide a housing therefor. The worm wheel 20 may be driven by means of a worm 23 on a shaft 24 driven by any suitable means such as an air motor 25. In order that the machine may conveniently be transferred to a location where work is to be done, the machine may be mounted on wheels 26a.

Heretofore material in each pocket when carried around to a discharge point was driven out of the end of the pocket by means of compressed air and in doing this it was necessary to substantially reverse the direction of flow of the compressed air in a very short space. In such prior form of feed wheel the conical central part was provided with a shoulder or shelf just above the upper edges of the blades and below this shelf the conical portion was flared outwardly at a greater angle so as to direct the material in the pocket towards the end of the pocket. It will be evident that with this arrangement the pockets were reduced in capacity.

These and other objectionable features may be avoided according to the present invention by carrying the cone down without any shelf and without any substantial change in inclination until the bottom of the blades is reached and by forming the bottom 18 of the receptacle 10 with a discharge passage 26 into which material in a pocket brought to discharge position in registry therewith will drop by gravity, said passage being so shaped as to gradually change the direction of flow of material from the surface of the adjacent portion of the conical member 14 to an outlet 27 through which compressed air and material from the receptacle 10 are discharged to the usual hose (not shown) through a flexible valve member 28, of suitable material such as rubber, which may be closed by a suitable clamp.

Compressed air for discharging the material from the receptacle 10 may be supplied through a pipe 29 controlled by a valve 30 to a compressed air duct 31 inside the receptacle 10 and above the passage 26, the duct 31 directing the flow of compressed air downwardly through each pocket in the discharge position and into the discharge passage 26 in the bottom 18 of the receptacle. To obtain the desired results the upper wall of the duct 31 is so shaped as to gradually turn the current of air downwardly and discharge it in a direction so that the stream will pass smoothly from the duct 31 along the lower surface of the passage 26 to the outlet 27. It has been found desirable, as in prior machines, to have the supply duct 31 and the outlet 27 in

a plate 32 which may be removed from the lower section 12 of the receptacle. In order to provide a continuous flow of air and material through the outlet 27, and thereby prevent a tendency to clog at this point, use may be made of a gasket 33, of suitable material such as rubber having a substantially conical inner surface adapted to direct the stream of air and material into the inner end of the valve member. The opening in the plate 32 in which the gasket is seated may be so located that at the inner side of the gasket, the material advanced by the air stream will flow smoothly from the bottom of the passage 26 into the gasket. It will be evident that the gasket 33 and the valve member 28 may be made in one piece.

In the present arrangement the duct 31 discharges the compressed air downwardly instead of downwardly and outwardly, as in prior machines, and the outlet 27 is spaced farther from the duct 31 so as to be substantially in registration with the outer end of the passage 26. The closed part of the lower side of the compressed air duct 31 covers the outer end of each pocket in position for discharge of its contents and opposite the outer end of each pocket in discharge position there is a recess 31a in the member 32 which recess communicates at its bottom with and forms part of the discharge passage 26 and has a curved inner surface to direct downwardly into the lower part 32a of said passage 26 material blown out of the end of a pocket.

Although machines of this type have been in use for many years there has been no substantial change in the arrangement at the side of the receptacle where the material is to be discharged, although various attempts have been made to make substantial improvements. It will be evident that according to the present arrangement, the material will be discharged from the receptacle much more effectively than before, the flow of compressed air being much smoother and the action of gravity assisting the compressed air in discharging the material from each pocket brought into registry with the compressed air duct 31 and the discharge passage 26.

It should be understood that various features may be changed, and that certain features may be used without others, without departing from the true spirit and scope of the invention.

What I claim is:

1. In apparatus of the class described, a feed wheel having a central portion with a conical exterior, and blades projecting radially from the lower part of said conical exterior to provide a plurality of circumferentially arranged pockets, a receptacle into the lower part of which said feed wheel fits so that said pockets are normally closed at their outer sides and bottoms, a compressed air duct with a downwardly directed outlet immediately above the level of the tops of said pockets so that the pockets may be brought in succession into registry therewith, and a discharge duct in the bottom of said receptacle and comprising a passage with an entrance immediately beneath the outlet of the compressed air duct and a discharge end below the general level of the pockets directing the flow smoothly to said discharge end, and a gasket, at said discharge end, having a conical passage therethrough to contract the cross section of the stream passing therethrough.

2. In apparatus of the character described, a feed wheel having a central portion with a conical exterior having substantially the same inclination

from top to bottom and blades projecting radially from the lower part of said conical exterior to provide a plurality of circumferentially arranged pockets, a receptacle into the lower part of which said feed wheel fits so that each of said pockets is normally closed at its outer side and bottom except at a discharge position, a compressed air duct extending radially inwardly and having a downwardly directed outlet immediately above the level of the tops of said pockets so that portions of the pockets spaced inwardly from the outer ends thereof may be brought in succession into registry therewith, a discharge duct extending to the outside of the receptacle below the level of said pockets and having an entrance immediately beneath the discharge end of the compressed air duct and extending the full length

of a pocket in the discharge position and upwardly across the outer end of said pocket, the portion of the discharge duct opposite the outer end of a pocket in discharge position being shaped to turn downwardly smoothly the stream of compressed air and material passing out the end of the pocket, and the portion of the discharge duct beneath a pocket in discharge position being shaped to turn the flow of material and air smoothly from a downward direction to a direction away from the axis of the feed wheel, and a gasket at the outlet end of said discharge duct, having a conical passage therethrough to contract the cross section of the stream passing therethrough.

BRYAN C. COLLIER.