April 23, 1946. F. D. WELCH 2,398,985

CAULKING GUN

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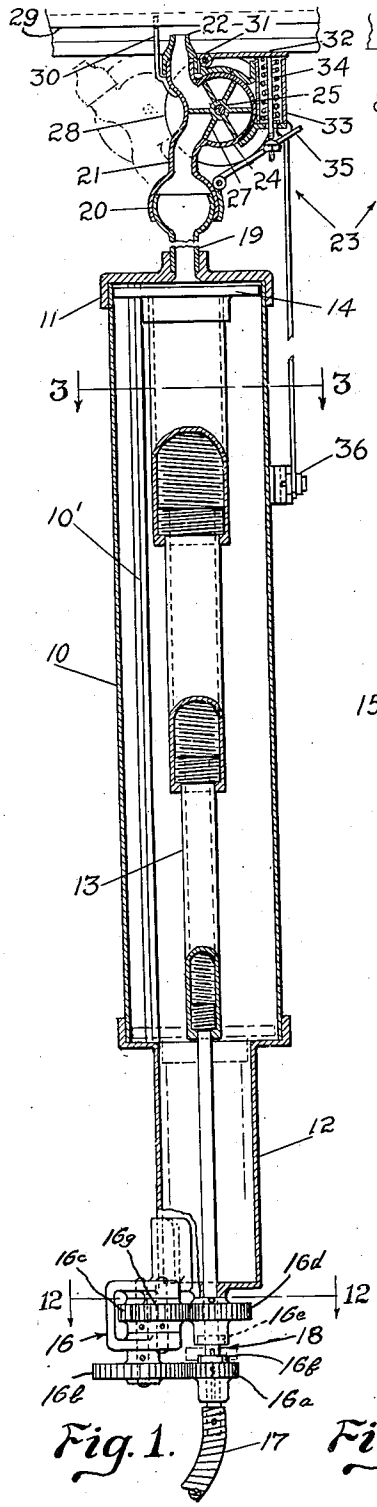



Fig. 1.

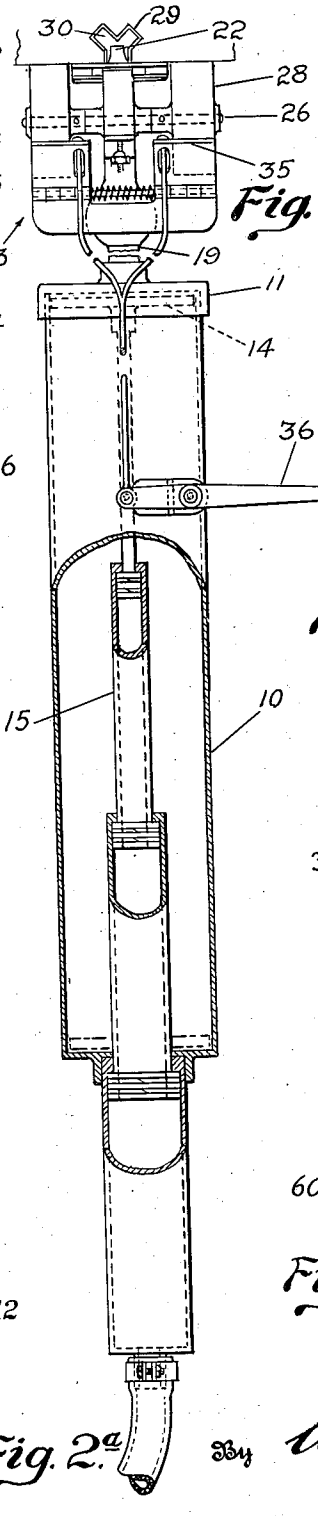



Fig. 2a.

Fig. 2.

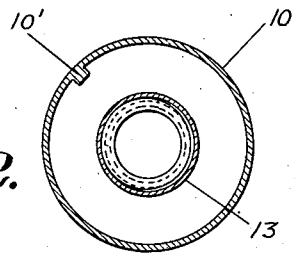



Fig. 3.

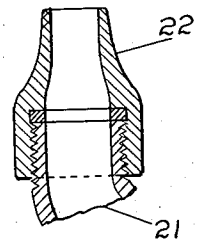



Fig. 4.

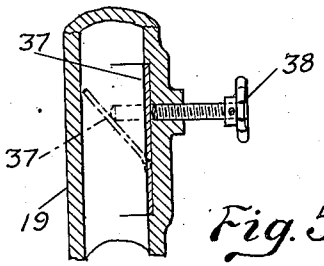



Fig. 5.

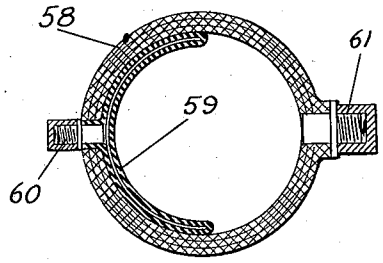



Fig. 6.

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CAULKING GUN

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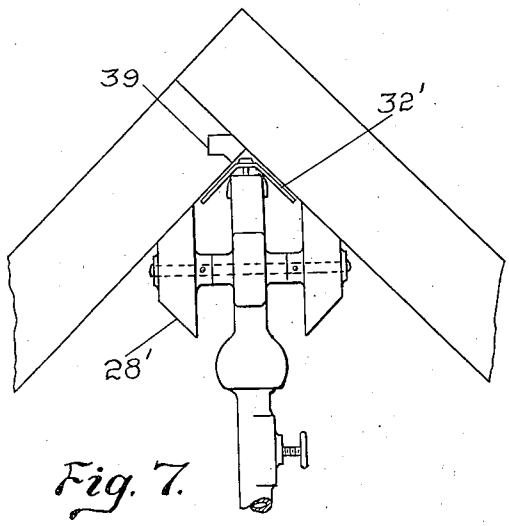



Fig. 7.

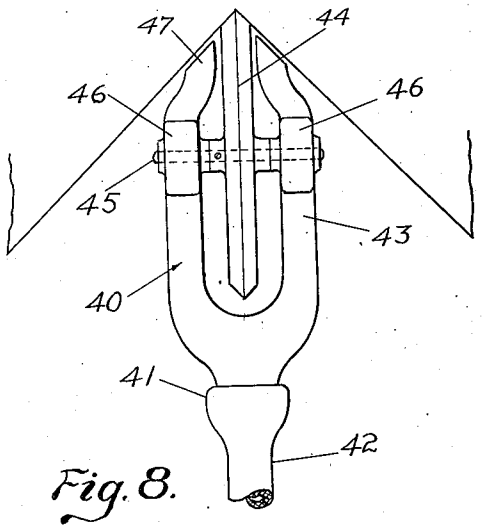



Fig. 8.

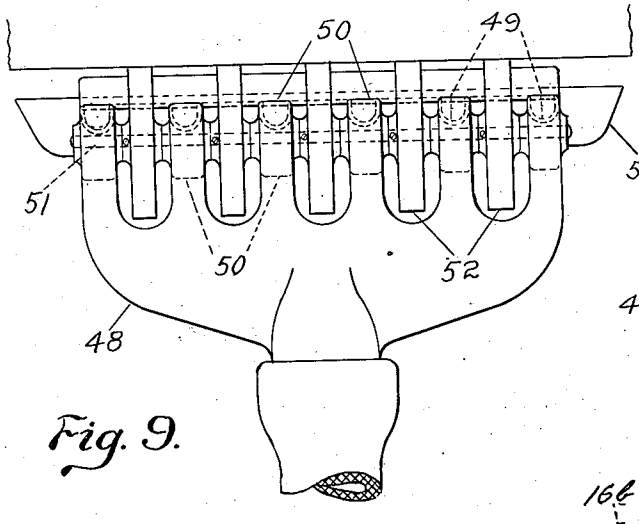



Fig. 9.

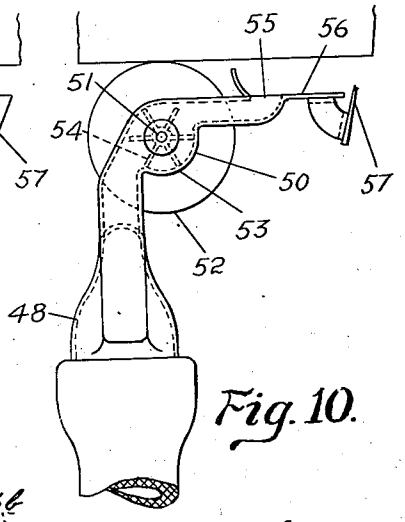



Fig. 10.

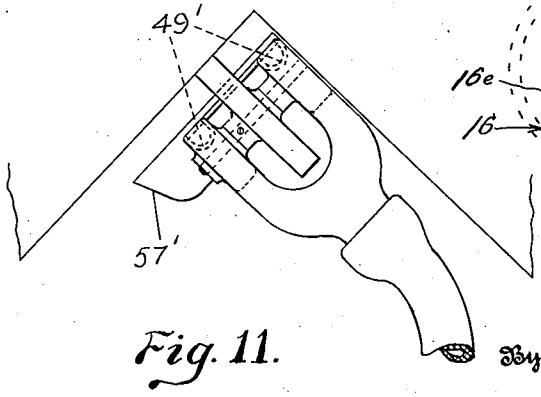



Fig. 11.

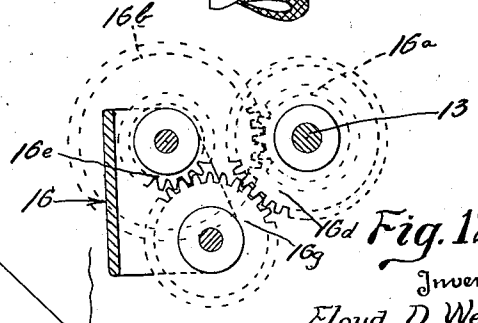



Fig. 12.

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# UNITED STATES PATENT OFFICE

2,398,985

## CAULKING GUN

Floyd D. Welch, Shreveport, La.

Application September 19, 1944, Serial No. 554,766

11 Claims. (Cl. 18—3.5)

This invention relates generally to devices for filling cracks and seams with plastic caulking material and pertains more particularly to an improved type of gun for projecting or forcing the sealing material into receiving cracks, channels or grooves which are to be closed tightly against the entrance of moisture, air or the like.

A principal object of the present invention is to provide a pressure caulking gun wherein the rate of discharge of caulking material is controlled by or proportional to the speed of movement of the discharge nozzle of the gun along the channel or groove being caulked.

Another object of the invention is to provide a pressure feed caulking gun having a rotatable feeding means in the discharge nozzle connected with a wheel member which is maintained in contact with the body being caulked and which functions to actuate the feed means so that the rate of speed of the caulking material is accelerated or retarded as the speed of movement of the caulking gun is increased or decreased.

Still another object of the invention is to provide an improved caulking gun having a novel flow control means for the caulking material operable in direct ratio with the speed of movement of the caulking gun, with novel means carried by the gun nozzle for spreading and smoothing the material as it is discharged.

A still further object of the invention is to provide a discharging or dispensing device for fluid or semi-fluid material with novel means for varying the rate of discharge in direct ratio with the speed of movement of the implement over the surface against which the material is being discharged, and with means trailing the discharge means or nozzle for spreading and smoothing the material at an even depth over the surface to which it is applied.

Other objects and advantages of the invention will become apparent as the description of the same proceeds and the invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming a part of the specification, it being understood, however, that the invention is not confined to a strict conformity with the showing of the drawings but may be changed or modified so long as such changes or modifications do not depart materially from the salient features of the invention as expressed in the appended claims.

In the drawings:

Figure 1 is a view in longitudinal section of a caulking gun constructed in accordance with one embodiment of the present invention.

Figure 2 is a view in elevation of the head portion of the gun as illustrated in Figure 1.

Figure 2a is a view partly in section and partly in elevation of a modified piston barrel or cylinder construction.

Figure 3 is a transverse section on the line 3—3 of Figure 1.

Figure 4 is a longitudinal section on an enlarged scale of the material discharging nozzle.

Figure 5 is a detail section illustrating the shut-off gate for the discharge hose.

Figure 6 is a transverse sectional view of a preferred form of hose for use in the tool.

Figure 7 illustrates a head construction for applying plastic in a groove in the angle between two walls.

Figure 8 illustrates a single wheel form of head unit for applying a coating material to two angularly related wall surfaces.

Figure 9 is a view in elevation of a modified head construction designed for spreading a coating on a wall surface.

Figure 10 is a view in end elevation of the structure shown in Figure 9.

Figure 11 illustrates another embodiment of head structure for spreading material over a wall surface close to an adjacent wall.

Figure 12 is a sectional view taken on the line 12—12 of Figure 1.

Referring now more particularly to the drawings, the numeral 10 generally designates a piston barrel or cylinder in which the plastic, caulking material, paint or other surface covering material is placed. This barrel at one end has removably attached thereto the head or cap 11 while at the opposite end it is of reduced diameter as indicated at 12 to provide a chamber or receiver for the telescopic sectional piston rod 13 by means of which the piston 14 is moved in the barrel. Suitable means, such as the rib 10' formed longitudinally of the inner wall of the barrel, is provided for engaging the piston to hold the latter against rotation in the barrel.

The sectional piston rod 13 may have the sections threaded together or they may be in the form of tubular pistons as shown in a modified embodiment of the invention illustrated in Figure 2a, where such tubular pistons are designated 15. In a construction where the piston rod sections are threadably coupled together, a gear drive, generally designated 16, may be employed for establishing a driving connection between the piston rod and the power shaft 17. This gear drive

preferably includes a shiftable gear pinion 16a which is keyed to the shaft 17 and which, when the gear train is set for driving the piston 14 inwardly, connects with the piston shaft or rod through the gears 16b, 16c and 16d. The last mentioned gear is secured to the end of the piston rod and it is provided with an inside clutch shell 16e which is designed to receive the clutch element 16f when the gear 16a is shifted inwardly out of connection with the gear 16b. Since there is no permanent direct connection between the power shaft 17 and the end of the piston rod it will be seen that when the gear 16a is moved out of connection with the gear 16b the clutch 16f will establish a direct drive between the shaft 17 and the piston rod 13.

The gear train 16 includes a counter-shaft on which is carried an idler gear 16g which connects together the gears 16c and 16d. Thus it will be apparent that when the gears 16a and 16b are coupled together the gear 16d will be rotated reversely to the gear 16a and at a reduced speed. When the clutch 16f is engaged with the hub of the gear 16d then a direct connection will be established between the splined end of the drive shaft 17, the gear 16a and the gear 16d and the two last mentioned gears will then rotate in the same direction and the direction of rotation for gear 16d will be the reverse of that when it is driven through the gear train so that the piston will be rapidly retracted in the cylinder 10.

The cylinder head or cap has connected therewith the discharge hose 19 which is connected by a knuckle joint 20 with a nozzle pipe 21, the free end of which is shaped to provide the nozzle tip 22. This nozzle tip is preferably detachably connected with the free end of the nozzle pipe so that tips of different sizes may be used as may be found necessary.

The nozzle pipe 21 forms a part of a head unit which is generally designated 23 and formed integral with the pipe 21 as a part of this head unit, is a feed wheel housing 24 which opens at one side into the nozzle pipe 21 and which encases a feed wheel 25. This feed wheel comprises a shaft 26 which extends transversely through the housing, and a plurality of blades 27 carried by the shaft which project at their tips into the nozzle pipe and are formed to fit snugly therein as they are turned therethrough. Thus each blade 27, upon rotation of the shaft, moves into and forms a closure in the nozzle pipe and as the blades turn and pass through the pipe they function as feeding means for fluent material which is forced through the pipe by the piston 14 working in the cylinder 10.

Upon the outer side of the housing 24 each end of the shaft 26 carries a friction wheel 28 which is preferably of relatively soft rubber and is designed to engage and move along a wall surface at one side of a channel or recess, such as is designated 29, into which the caulking material is being discharged from the nozzle tip 22.

Attached to the nozzle pipe in advance of the nozzle tip 22 is a baffle plate or apron 30 which is designed to position in and form a partition across the channel or groove 29 into which the caulking material is injected so as to insure proper filling of the channel and prevent the material being forced into the channel ahead of the nozzle tip.

Rearwardly of the nozzle tip 23 there is pivotally attached to the nozzle pipe as at 31, the smoothing or wiping plate 32 which substantially spans the space between the friction wheels 28 and covers the channel or groove 29. This plate functions to smooth out the plastic caulking material in the channel or groove.

In order to insure the proper application of pressure by the plate 32 against the introduced caulking material, there is encased within a suitable guide or housing 33, a pressure spring 34 which bears against the plate 32 and presses it tightly against the underlying surface.

As will be readily understood the caulking material within the cylinder 10 is maintained under constant pressure either by forcing the piston 14 forwardly by the power means, not shown, connected with the shaft 17, the speed reduction gearing 16 and the sectional threaded piston rod 13, or by the introduction of suitable fluid under pressure, such as air, into the tubular piston sections 15. Consequently, it will be seen that the pressure of the material in the nozzle pipe 21 against the blade 29 of the feed wheel would tend to rotate the wheel so that the plastic material would escape from the nozzle if some means were not provided to hold the feed wheel against turning. Accordingly, there is provided a brake means comprising friction shoes 35 supported for movement relative to the peripheries of the rubber wheels 28 and constantly urged into contact with such wheels to hold the wheels and the feed wheel 25 against rotation. Means is provided in the form of the pivoted lever 36, for releasing the pressure of the friction shoes against the wheels 28 when the gun is in use.

When the gun is being used the wheels 28 are maintained in contact with the surface at the two sides of the channel or groove 29 and the brake shoes 35 are released from contact with the wheels 28. The user of the gun then controls the rate of flow of the caulking material from the nozzle tip by the speed with which the head unit is moved along the groove or channel and the wheels 28 are rotated. Thus it will be seen that by moving the wheels 28 very slowly the feed wheel 25 will be moved slowly also and the material will be fed at a slow rate into the channel or groove or the speed of application of the caulking material may be stepped up by increasing the speed of movement of the caulking gun along the channel. Thus the caulking material may be applied as fast as desired by the workman without requiring the manipulation on the part of the workman of feed or control valves.

In the nozzle pipe 19 there is mounted the shiftable valve flap or tongue 37 and a thumb screw 38 is threaded through the wall of the pipe and is employed to regulate the position of the valve flap so that the quantity of the plastic material allowed to reach the feed wheel 25 may be regulated.

Figure 7 shows a modified construction for facilitating the application of the caulking material into corner channels or grooves, such as that designated 39. In this construction the valve pipe, feed wheel and corresponding parts are of the same construction and design as shown in Figure 1, but the friction wheels here designated 28' are of conical form and are arranged on the supporting shaft to have the beveled faces directed away from the center of the head and the peripheral faces of the wheels lie in planes which intersect at 90°. Thus the head may be placed in a corner as shown, and the wheels will have good frictional contact with the adjacent wall surfaces so as to be rotated as the head of the tool is moved along the channel formed in the angle between the walls.

In this modified embodiment of the invention

the caulking material smoothing plate which is designated 32', instead of being flat, is of angle form so that the outer faces of the two angularly related portions form a 90° angle to fit into the corner as illustrated.

The present tool is also adaptable for use in applying plastic paint or regular cement plaster in a desired thickness, to a receiving surface and Figures 6 to 11, illustrate several forms of heads which may be used for this purpose.

In Figure 8, there is illustrated a head construction for this purpose, designed to facilitate application of paint or cement plaster to angularly related surfaces. In this construction the head 40 is swivelly coupled as at 41 to the nozzle tube 42. This head is bifurcated and there is mounted in the space between the furcations, which are designated 43, the single traction wheel 44 which is supported upon the shaft 45 which passes through the feed wheel housing 46. Upon this shaft there is supported in each of the two housing sections, a feed wheel, not shown. which is of similar construction to the wheel 45 and these wheels operate to control the passage of the fluent material through the head and to and through the discharge nozzles 47, which nozzles are angled as shown so that each will present an edge to the adjacent wall surface, in parallel relation to such surface but spaced therefrom. Thus as the plaster or plastic paint passes from the nozzle it will be spread by the edges of the nozzle opening over the wall surface.

Figures 9 and 10 show a further embodiment of the plastic paint or cement plaster spreading head which is designed to spread the fluent material over a relatively wide wall area. In these forms the nozzle head is generally designated 48 and is divided into a series of nozzle sections 49 each of which has a feed wheel housing 50 integral therewith. Extending transversely through the nozzle unit is the shaft 51 upon which is mounted between the nozzle feed wheel housings the traction wheels 52.

Within each feed wheel housing 50 is a wheel 53 of the same design or construction as wheel 25, having blades 54 mounted upon the shaft 51 and adapted to move into and out of the adjacent nozzle unit as the shaft revolves, to successively form moving partitions across the nozzle units and thus regulate the flow of material therethrough.

The nozzle units are formed so that the mouth or discharge port 55 of each is somewhat behind the adjacent feed wheel so as to trail the wheel and there is connected across between the nozzle units at the rear or trailing sides thereof, the thickness or depth regulating plate 56 by which the thickness of the plastic material is controlled. Immediately following the plate 56 and disposed at an angle to the surface over which the unit is being moved, is a spreader or scraper blade 57 which smoothes out the applied material.

Figure 11 illustrates a modified form of the head illustrated in the figures just described, which is designed to work in a corner. As will be readily apparent, the principal distinction between this form and the corresponding head structure resides in the fact that the spreader blade 57' terminates in the plane of one end nozzle unit 49' so that the side of this unit can be moved into close proximity to the wall surface lying perpendicular to the surface to which the coating is being applied.

Figure 6 illustrates in cross-section a construction of hose designed for use in connection with a tool of the character herein described to facilitate easy cleaning of the hose leading from the cylinder to the nozzle head unit. This hose comprises a regular hose body 58 having disposed longitudinally therein a normally collapsed tube 59 between which and the opposite half of the hose wall the plastic material flows to the discharge nozzle. Connected with the tube 59 is an air admission valve 60 adapted to have an air pressure hose connected therewith so that the inner tube may be inflated within the hose 58.

With the hose body 58 there is connected a valve 61 designed to have a water hose attached thereto so that water may be injected into the hose body 58.

As will be readily apparent, after the gun has been used some of the plastic material will remain in the hose leading from the gun barrel to the nozzle and by inflating the collapsed inner tube 59 all of this residual material will be pressed out and if desired the hose 58 may be then thoroughly cleaned by connecting a water hose at the valve 61 and flushing water through the hose 58.

I claim:

1. A plastic material dispensing gun, comprising a receptacle adapted to contain material under pressure and having an outlet, a discharge tube connected with the outlet, a nozzle at the end of the discharge tube, a wheel rotatably supported by and adjacent to the tube and having blades arranged to enter the tube successively upon rotation of the wheel to control the flow of material through the tube, and means connected with the wheel and adapted to be rotated in the use of the gun to effect the turning of the wheel.

2. A dispensing gun of the character set forth in claim 1, with a material smoothing plate supported in a position to trail the nozzle and smooth down the material discharged from the nozzle.

3. A gun of the character stated in claim 1, in which the stated rotary means connected with the wheel comprises a surface contacting friction wheel connected co-axially with the first wheel.

4. A plastic material dispensing gun as set forth in claim 1, in which said nozzle is adapted to enter a material receiving channel, and a baffle plate supported at one side of the nozzle and adapted to be positioned in the channel in advance of the nozzle to form an advancing partitioning wall in the channel.

5. A plastic material dispensing gun as set forth in claim 1, with shiftable means supported adjacent to the nozzle and in position to trail the latter for spreading and smoothing the material discharged from the nozzle.

6. A plastic material dispensing gun, comprising a receptacle adapted to contain material under pressure and having an outlet, a discharge tube leading from the outlet, a nozzle upon the free end of the tube, a housing supported by and at one side of the tube and opening thereinto, a wheel rotatably supported in the housing and having blades arranged to enter at their ends into the tube upon rotation of the wheel and to successively form partitioning means in the tube, and a surface engaging traction wheel disposed outside of said housing and connected with said wheel to rotate co-axially therewith.

7. A plastic material dispensing gun, comprising a receptacle adapted to contain material under pressure and having an outlet, a material discharge conduit leading from said outlet, a housing connected with the conduit and opening

thereinto, a wheel rotatably supported in the housing and having radial blades, the radial blades entering at their ends into the conduit in the rotation of the wheel to form successive partitions moving in the conduit toward the outlet end thereof, a traction wheel connected with the first wheel outside said housing for engagement with a surface, and a releasable brake means normally engaging the traction wheel to hold the latter against rotation.

8. A material dispensing gun as set forth in claim 7, with a plate member joined to the conduit and arranged to pass over and smooth down material ejected from the conduit.

9. A material dispensing gun as set forth in claim 7, with a nozzle connected with the conduit at the outlet end thereof, and a baffle plate supported at one side of the nozzle and adapted to enter into a material receiving channel in which the nozzle discharges, to provide a movable partition in the channel in advance of the nozzle.

10. A material dispensing gun as set forth in claim 7, with a nozzle attached to the discharge end of the conduit, a baffle plate secured adjacent to one side of the nozzle and adapted to enter a channel into which the nozzle discharges to form a movable partition in advance of the nozzle, a finish plate attached to the conduit upon the side of the nozzle opposite from the baffle to move over and smooth off material discharged from the nozzle, and resilient means constantly urging the finish plate in a direction to press against the discharged material.

11. A material dispensing gun as set forth in claim 7, with an adjustable valve in the conduit between the receptacle outlet and the first mentioned wheel for controlling the quantity of material passing through the conduit.

FLOYD D. WELCH.