MORTAR GUN FOR POINTING JOINTS IN WALLS, ETC

March 3, 1953

J. LEACH

2,630,006

Filed Sept. 28, 1948

2 SHEETS—SHEET 2

Fig. 7

Fig. 8

Fig. 9

Fig. 10

Joseph Leach
Inventor.

By Emil Kundert
Attorney.
This invention relates to improvements in guns for tuck-pointing brick or brick-faced walls, stone or stone-faced walls, and the like.

According to methods now used, tuck-pointing or repointing of brick, stone and other walls constructed of or faced with units joined with mortar, is effected with a tuck-pointing tool carried in one hand and by means of which small quantities of mortar are taken from a suitable mass heaped on a small mortarboard carried in the other hand and applied to the joints between such units and pressed to the desired form or finish which the joints are to finally have. This is a slow and expensive procedure requiring the services of well trained and highly paid artisans.

Guns of the general type to which this invention relates are in common use for ejecting plastic compositions of the consistency of calcining material, grease, and the like, but such guns are incapable of ejecting mortar used for pointing or repointing joints between bricks or stones, due to the fact that the construction of the plungers in the gun tends to jam the latter and the mortar in the barrel of the gun and because of the formation of the nozzles and the finish of the same, mortar will not have the free movement required under such force as can be manually applied with the actuating mechanism. Guns of this general type are equipped, since mortar used for pointing is drier and heavier and therefore less plastic, with the result that the restricted escape passage in the nozzle of the gun sets up sufficient resistance to the flow of the mortar that the pressure exerted thereon by the actuating mechanism of the gun will cause the mortar to exert its force against the expanding washer or similar element of the plunger and jam said element against the wall of the gun-barrel and the mortar in the barrel between the plunger and the nozzle.

The principal object of this invention is to provide a gun of the type mentioned by means of which mortar used for pointing or repointing purposes can be ejected in the manner in which free-flowing calcining material and grease are now ejected from guns.

Another object is to provide such a gun by means of which mortar may be applied to joints of walls in a speedy and efficient manner and if desired, the joints finished to form.

A further object is to construct the nozzle of the gun so that the passage in its discharge nose or snout is wider transversely in one direction than the other and thus enable the gun to be used as a pointing tool.

A further object is to so construct the dis-
ably a bayonet-joint connection with said tube or casing of any well known construction; a washer 18 being clamped between the front end of said casing and an internal shoulder 11 formed in said discharge nozzle, said washer serving to prevent leakage of material and moisture at this point.

The bayonet joint comprises segmental outstanding flanges 7 on the front end of the casing or body portion 7 of the gun with the ends of said flanges spaced apart to form opposite notches 5. The tapering nozzle 8 has a cylindrical portion portion 12 of its rear end of a diameter to receive the front or adjacent portion of the casing or body portion 7 and the flanges thereof, and from the peripheral wall of this cylindrical rear end portion 5, lock-lugs 6 project inwardly toward the axis of the nozzle and are passed through the spaces or notches 5 at the ends of the flanges 7; said lock-lugs extending radially from the outer end of the casing or body portion 7 and interlocking with the flanges 7 in any conventional manner.

The inwardly-tapered portion of the nozzle 8, which I further and more particularly designate by the numeral 11, terminates at its front or free end in said discharge nozzle and the interior of said nozzle, including said nose, is chrome-plated and so plated said nose and nozzle prevents separation of water from the heavier portion of the mortar under friction and thus allows the mortar with its moisture content to pass out freely through the discharge nozzle. The discharge nozzle 8 is preferably restricted in cross sectional measurements externally to that of the smallest diameter of the inwardly-tapered portion 12 of the nozzle, and as Fig. 10 and a comparison of Figs. 4 and 5 will show, the passage or opening through the nose is transversely of oblong formation, that is to say, it is of different dimensions at right angles, as is the exterior of the nose. Consequently a passage or opening through the nose is provided which is elongated in one direction and therefore has a major transverse dimension and a minor transverse dimension and which when the gun is moved along a joint between courses or layers of brick, stone or the like, or between two bricks, stones or the like in a single layer or course, it will not cover up any considerable portions of the wall at opposite sides of the joint being filled with mortar and will enable the operator of the gun to have a clear view of the joint and the requirements for mortar at any point along the joint can be ascertained; thereby enabling him to control the supply of mortar by manipulating the gun accordingly.

I prefer to have the discharge nozzle or snout as it may be termed, constructed of chrome nickel steel to prevent rusting and wear on the exterior surfaces thereof and this nose or snout I preferably braze to the tapered portion of the nozzle.

Removably fastened in any suitable manner to the rear end of the casing or body portion 7 is a closure or cap 13 having a stock 14 brazed or otherwise fastened thereto.

As shown in the drawings, this stock is constructed of sheet metal having spaced-apart side walls 16 connected by an outer edge wall 15 and within this stock the last part of the plunger-actuating mechanism 17 of the gun is arranged. This plunger-actuating mechanism may be of any construction or arrangement of parts, but in the drawings I have shown a roller 18 rotatable on a pin 19 fastened in the side walls of the stock, against which the usual plunger rod to be hereinafter described is arranged for movable contact.

Slidably movable in the casing or body portion of the gun is a plunger 20 which has axially secured thereto the plunger rod 21 extending outwardly through the closure or cap 13 and through a notch or opening 22 in the outer edge wall 16 of the stock. This plunger rod is provided with a handle 23 at its outer end, and for a considerable distance along its length it is provided with a series of teeth 24 engaged by an actuator dog 25 pivotally secured to a trigger 26 which in turn pivotally is secured to the side walls 15 of the stock, as at 27, a spring 28 maintaining the actuator dog in contact with the teeth of the plunger rod. A detent dog 29 is also pivotally secured between the side walls of the stock and its nose or free end is in contact with the series of teeth formed in the plunger rod, said detent dog being maintained in contact with said teeth by a spring 30. The trigger 26 is maintained in its normal position, which is that shown in Fig. 1, by means of a trigger spring 31 interspersed between it and the outer edge wall 16 of the stock.

This actuating mechanism need not be further described since it forms no part of my invention.

In the terminals of the actuating dog and the detent I prefer to machine a notch 32 and fit it and silver solder into said notches, carbide or other toes 33 of hardened material so as to prolong the life of these dogs and prevent rusting of portions of the dogs which come in contact with the plunger rods. I also chrome plate the plunger rod so as to prevent oxidation thereof and assure free movement of the same under manipulation of the actuating mechanism.

It will be clear therefore that upon drawing the trigger 26 rearwardly toward the rear edge wall 16 of the stock, the actuator dog 25 will force the plunger rod forwardly and consequently cause movement of the plunger 20 forwardly toward the discharge nozzle 8, moving the mortar within the casing or body portion in a like direction and extruding the same from the nose or snout of the nozzle.

During such movement the teeth of the plunger rod ride over the detent dog 29 and cause the same to engage the next tooth in the series of teeth formed in the plunger rod. Upon releasing the trigger 26 the actuator dog 25 will move along the slinger rod and engage the next tooth in the series, while the trigger itself assumes its normal position. The quantity of material extruded from the gun de-ends on the number of times the trigger is actuated. When the mortar is completely exhausted under movement of the plunger, the plunger rod is rotated to cause the teeth thereof to face upwardly as viewed in Fig. 1, which then permits the rod to be drawn rearwardly and with it the plunger attached thereto. In this manner the plunger will be moved to the stock or rear end of the casing or body portion after which the mortar may be easily removed from the casing or body portion. With the nozzle removed the casing or body portion can be easily refilled with mortar, after which the nozzle is again applied and fastened in a water-tight manner to the casing or body portion. When filled with mortar, the plunger rod is again turned to a position so as to face downwardly as viewed in Fig. 1, and thus cause the actuator dog and the detent dog to engage the teeth of the rod and position them.
for actuation in the manner hereinbefore described.

The nose 9 of the nozzle 8 is shortened at one side of its longitudinal axis so that the free end face thereof is disposed in a generally oblique direction and the terminal end edges or faces 34 and 35 of the walls of the nose are beveled or convexly curved outwardly from the mortar-discharge portion 8 of the nozzle 8. In the case of said walls, the beveled edges of the walls of said nose preferably merging into each other to substantially conform with a segment of a sphere and they are disposed at an acute angle with respect to the axis of said nozzle 8 whereby the elongated portions of the walls defining the nose 9 form a convex strike off or ironing area for the mortar delivered by the gun into the seams or joints of a wall.

From the foregoing it will be apparent that the nose 9 of the gun is tubular and has its side walls substantially parallel and that such side walls may be utilized for moving contact with the corners of bricks at one or both sides of a joint or seam requiring pointing mortar and that by tilting the gun laterally while moving the same longitudinally along a seam or joint 36, the face of the nozzle 8 for pointing mortar may be varied in form and that by rocking the gun while in contact with the wall, using the major axis of the nose as a fulcrum, as clearly shown in Fig. 5, the amount of mortar issuing from the mortar-discharge portion 8 may be increased or diminished, as required. Since the terminal end edges of the walls of the nose 9 are curved to conform with a segment of a sphere, it will be apparent that the nozzle can be tilted universally while the end face thereof is held in moving contact with the wall and that not only the desired form or style of joint may be provided, but at the same time the quantity of mortar can be regulated to conform to the type of joint to be provided.

The tiling of the nozzle in the direction of the longitudinal major axis of the nose under rocking movement, using the convex end face 34 as shown in Fig. 5 as a fulcrum, uncovered more or less of the exit opening in the nose or snout and thus, while drawing the latter along a joint between layers of brick or stone, enables the needed quantity of mortar to be extruded from the gun into the joint while the portion in rear of the mortar thus filled into the joint is ironed smoothly by that portion of the end face following the exit opening; thus the exact quantity of mortar to be entered in the joints is governed by the tilting of the nozzle and necessarily that of the gun, to the casing or body portion of which the nozzle is attached. Converging the end face of the nozzle in a cross direction, as shown at 35, assures a line contact of said end face with the corners of bricks at opposite sides of a horizontal joint and thus regardless of the width of the joint, which varies slightly in every wall, mortar extruded from the gun will be definitely limited to the space between bricks or stones forming a joint and cannot possibly find its way out of such bricks or stones, yet the mortar has free passage laterally within the joint so as to completely fill the latter within the confines of the line contacts between the end edge of the nose or snout and the bricks at opposite sides of the joint.

I wish to emphasize the fact that for extruding or expelling mortar from a gun, the plunger serving as the force controlling the discharge of mortar from the gun, must be incapable of becoming wedged against the cylindrical wall of the casing or body portion and also incapable of causing the mortar in advance of the same to be packed within the gun, and the plunger I have designed to overcome such tendencies or prevent such conditions to exist consists of a body portion 38 comprising a disk 39 of a diameter to freely move in contact with the inner surface of the wall of the casing or body portion, as shown in Fig. 3, of the drawings this disk has axially projecting from one flat face thereof, a boss 40 into which is threaded the reduced inner end 41 of the plunger rod 21. Axially projecting from its other flat face is a screw stud 42 and seated against the last-mentioned flat face of said disk is the end wall 43 of a leather or other flexible cup-like member 44, the end wall 43 having an opening axially therethrough to enable the cup to be passed over the screw stud 42. The peripheral wall 45 of said cup-like member has its free end thickened, as at 46, and the outer end of its inner surface is beveled as at 47. The outer diameter of the thickened end portion of this cup-like flexible member, which serves as a riding-contact washer, is normally of slightly greater diameter than the diameter of the disk 39 forming part of the body portion 38; thus the diameter along the major portion of this cup-like member or washer is slightly less than the diameter of said disk and necessarily the outer thickened portion of said member or washer, and placed around the smaller region of this member or washer is a confining or restricting ring 48 which is clamped between the marginal portion of the disk 39 and a shoulder 49 on the flexible member or washer formed by thickening the outer end of its peripheral wall. In this manner only the outer end portion of said peripheral wall is capable of being flexed outwardly, while the remainder of said cup-like member or washer is confined within the confining or restricting ring.

The said flexible cup-like member or washer is fastened in place against the disk 39 of the body portion of the plunger by a clamping disk 53 fitted therein and bearing against the inner face of the end wall of the gun, the disk having an axial opening to enable it to be moved along the screw stud 42 and it is held in firm contact against said end wall by means of a nut 51 threaded onto said screw stud. In this manner the parts of the plunger thus far described are held rigidly together and incapable of movement relatively one with respect to another until the nut 51 is loosened to permit of such movement. However the free outer end of the peripheral wall is capable of being flexed outwardly under force and for this purpose an expander 52 is provided which is in the form of a dished member having its outer peripheral surface tapered inwardly, as at 53, and in contact with the outwardly beveled circular region 41 formed at the outer free end portion of the peripheral wall of the flexible cup-like member or washer 44. This expander is threaded onto the screw stud 42 and preferably has wrench holes 54 therein adapted to receive parts of a spanner wrench whereby it may be threaded outwardly and inwardly along the screw stud to exert the desired pressure against the expansible beveled free end portion of the peripheral wall of the cup-like member or washer 44 and after the desired adjustment is made to assure proper packing movement of the plunger within the casing or body portion of the gun, this
2,630,006

expander is retained in adjusted position by a jam nut 55.

The flexible feathers or other material used as the casing 44 and the aggregate in the mortar are used as a lapping medium and prevent any passage of the mortar rearwardly along the plunger during the forcible forward movement of the latter and this is of decided advantage, due to the fact that the tubing used as casings or valves for guns of this general type are not true and vary from 5 to 8 one-thousandths of an inch from true cylindrical formation. The results obtained by the use of my improved gun are such that jamming of the plunger within the casing or body portion of the gun cannot take place.

After adjustment of the expander 52 the plunger holds its true diameter and as the mortar is forced out of the gradually narrowing passage formed in the nozzle of the gun the aggregate in the mortar, including sand and other sharp cutting material, has no effect on the surface of the wall of such passage, due to the heavy chrome plating given the same.

It will be apparent from the foregoing that my invention distinguishes from pointing guns provided with ironing terminals which not only cover up long stretches of the joints operated upon, but also considerable areas of the layers of brick or stone above or beneath the joint, or between bricks or stones in any given layer; thus compelling the operator to apply mortar blindly to a joint without any possibility of manipulating the gun so that the mortar will be supplied to the joint under exact requirements caused by the old mortar in a joint having been worn away more at one point than another, or becoming disintegrated in areas which would necessarily call for a greater supply of mortar than where the mortar is worn away solely by the elements of the weather. A gun having a nose or snout as small in cross section as the smallest cross sectional dimension of the gun, and especially the tapering nozzle, assures the operator full view of the joint as he moves the gun along the same and enables him to supply the mortar in quantities required to point the joint evenly at all points thereof.

By curving the end of the snout in the direction in which the gun is moved, the operator is aided materially in governing the supply of mortar according to requirements by merely tipping the gun in the direction of the joint; the end faces of the end walls of the discharge or mortar-outlet opening of the nose or snout serving as ironing faces or areas which will evenly spread the mortar as discharged so that the joint will be smoothly filled its full width even with the surfaces of the bricks or stone at opposite sides of the joint.

Moreover, by transversely convexing the end of the nose or snout and so tilting the gun with or without component tilting movement of the gun in the direction in which it is traveling or in an opposite direction, the operator is capable of applying the mortar to the joint in a receding manner with respect to the face of the brick or stones in the layer above the joint and sloping the applied mortar downward along the convex edge of the brick or stones in the layer or course below the joint; thereby forming a water-shedding joint, the mortar of which has been smoothed or flared along the entire joint by one or the other end walls of the mortar-outlet opening in the nose or snout of the gun.

Having thus described my invention what I claim is:

1. In a mortar gun, a plunger comprising a rigid body portion of disk-like formation and having a plunger rod extending axially therefrom in one direction and a screw stud being expandable axially therefrom in the opposite direction, a cup-like flexible member having its closed end bearing against said disk-like body portion and having an axial opening through which said screw stud is passed, the peripheral wall of said cup-like flexible member being expandable axially through which said screw stud is axially passed and which bears against the inner surface of the closed end of said cup-like member, a nut applied to said screw stud and bearing against said clamping member and an expander threaded onto said screw stud and having a tapered circumferential surface engaging the free end of the peripheral wall of said cup-like member to cause said free end to be forced outwardly, said expander being adjustable along said screw stud to govern the extent to which the free end of said peripheral wall is expanded.

2. In a mortar gun, a plunger comprising a rigid support having a disk-like member, a cup-like member fastened to one side of said disk-like member and having a flexible peripheral wall, an enclosing member encircling a portion of the length of said peripheral wall to prevent outward expansion of said major portion and to provide a free end for said wall, the free end of said wall being beveled outwardly on its inner surface, and adjustable expander means carried by said support and having an inwardly-tapered peripheral surface engaging the outwardly beveled portion at the free end of said peripheral wall, said expander means being adjustable axially with respect to said rigid support to expand the free end of said wall in accordance with the adjustment made for said expander means.

3. In a mortar gun, a plunger comprising a rigid body portion of disk-like formation including a screw-stud extending axially therefrom in one direction and having a plunger rod extending axially therefrom in the opposite direction, a cup-like flexible member having its closed end bearing against said disk-like body portion and having an axial opening through which said screw stud is passed, the peripheral wall of said cup-like flexible member being outwardly enlarged at its free end to provide a shoulder on the same, a confining ring encircling said peripheral wall between said shoulder and the marginal portion of said disk-like body portion, a clamping-disk through which said screw stud is axially passed and which bears against the inner surface of the closed end of said cup-like member, a nut applied to said screw-stud and bearing against said clamping-member, and an expander threaded onto said screw stud and having an inwardly-tapered peripheral surface engaging the outwardly enlarged free end of the peripheral wall of said cup-like member at said free end to be expanded outwardly, said expander being adjustable along said screw stud to govern the extent to which the free end of said peripheral wall is expanded.

4. A mortar gun for pointing joints between layers of brick and the like, comprising a cylindrical tube provided at one end thereof with a discharge nozzle tapered inwardly from said tube and having a tubular nose projecting from its small end whose axis is coincident with the axis of said tapered discharge nozzle, said nose
having a mortar-outlet passage therethrough provided with a major transverse dimension and a minor transverse dimension at right angles thereto, the terminal end faces of said nose being curved to conform substantially with a segment of a sphere and being at an acute angle with respect to the axis of said nose whereby the elongated portion of the wall defining the nozzle forms a convex strike-off for the mortar; as it issues from said outlet passage and serves to shape the applied mortar to desired form, and means to eject mortar from within said tube and nozzle through said mortar-outlet passage.

5. A mortar gun, comprising an elongated cylindrical tube provided at one end with a discharge nozzle tapering inwardly toward its axis and having a tubular nose at its small end of elongated formation in cross section to provide a major axis and a minor axis, said nose being provided with a mortar-discharge passage of oblong formation in cross section leading from said tapered nozzle to the free end of said nose, the end face of said nose being disposed in a generally oblique direction with respect to the longitudinal axis of said nose and made convex in the direction of its major axis, and a plunger movable axially in said cylindrical tube.

6. A mortar gun, comprising an elongated cylindrical tube provided at one end with a removable discharge nozzle tapering inwardly toward its axis and having a nose at its small end whose front end is disposed in a generally oblique direction with respect to its axis to provide an oblong mortar-outlet opening at its free end, the free ends of the walls of said nose being made convex from said mortar-outlet opening to the outer surfaces of the walls of the nose, and a plunger movable axially in said cylindrical tube.

7. A mortar gun, comprising an elongated cylindrical tube provided at one end with a discharge nozzle tapering inwardly toward its axis and having a tubular nose at its small end with its axis in line with the axis of said nozzle, the terminal end edges of the walls of said nose being curved to conform with a segment of a sphere and being disposed at an acute angle with respect to the axis of said nozzle whereby the elongated portion of the wall defining the nose forms a convex strike-off for the mortar, and a plunger movable axially in said cylindrical tube.

JOSEPH LEACH.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>845,530</td>
<td>Davis</td>
<td>Feb. 26, 1907</td>
</tr>
<tr>
<td>1,038,180</td>
<td>Moreland</td>
<td>Sept. 10, 1912</td>
</tr>
<tr>
<td>1,142,022</td>
<td>Chappell</td>
<td>June 8, 1915</td>
</tr>
<tr>
<td>1,536,477</td>
<td>Crewe</td>
<td>May 5, 1925</td>
</tr>
<tr>
<td>1,782,579</td>
<td>Morrow</td>
<td>Nov. 25, 1930</td>
</tr>
<tr>
<td>2,023,830</td>
<td>Pustelovsky</td>
<td>Dec. 10, 1935</td>
</tr>
<tr>
<td>2,119,891</td>
<td>Sherbondy</td>
<td>Apr. 20, 1938</td>
</tr>
<tr>
<td>2,381,263</td>
<td>Darling et al.</td>
<td>Aug. 7, 1945</td>
</tr>
<tr>
<td>2,497,762</td>
<td>Davis</td>
<td>Feb. 14, 1950</td>
</tr>
</tbody>
</table>

OTHER REFERENCES

The Clay Worker, March 1932, page 156.