July 20, 1943. B. JORGENSEN 2,324,510

CEMENT APPLYING MECHANISM

Original Filed Feb. 4, 1941 2 Sheets-Sheet 1

Fig. 1.

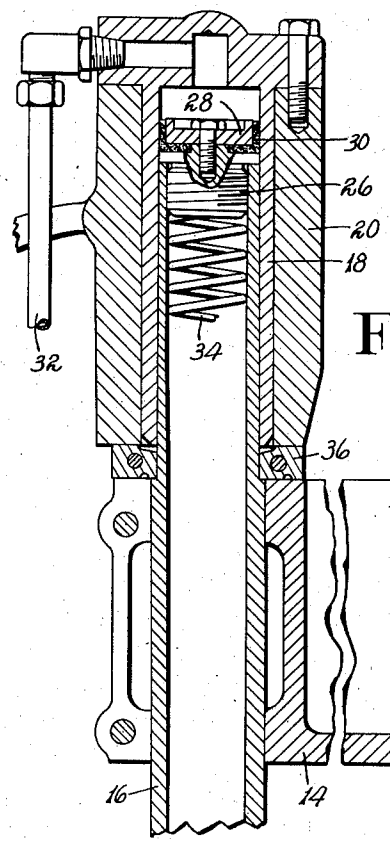


Fig. 3.

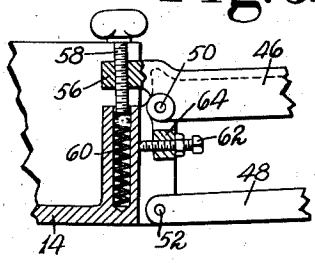


Fig. 2.

INVENTOR

Bernhardt Jorgensen

By his Attorney

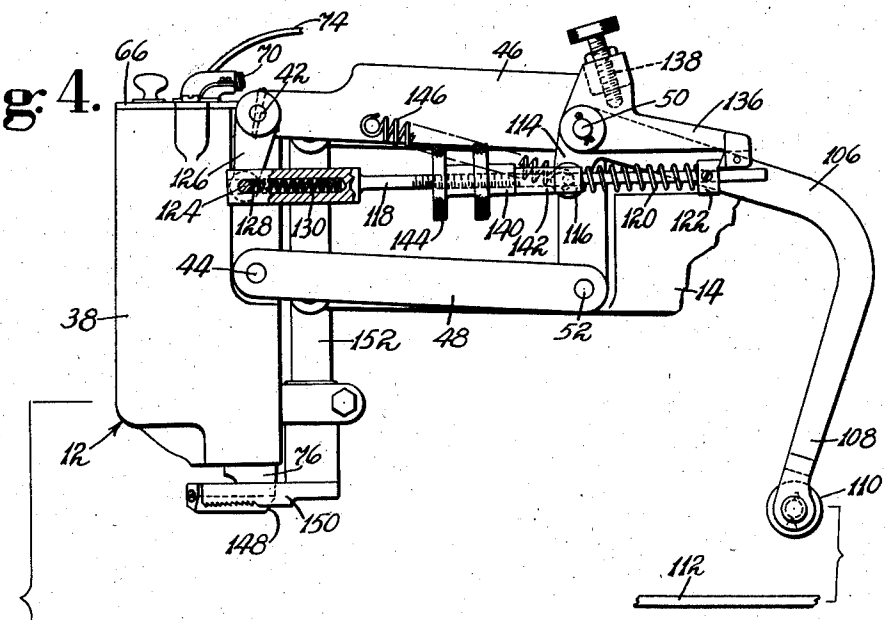
Clarence A. Coakley

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CEMENT APPLYING MECHANISM

Original Filed Feb. 4, 1941 2 Sheets-Sheet 2

Fig. 4.



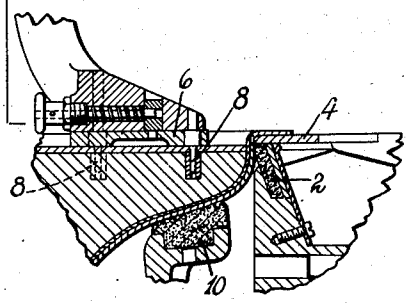


Fig. 7.

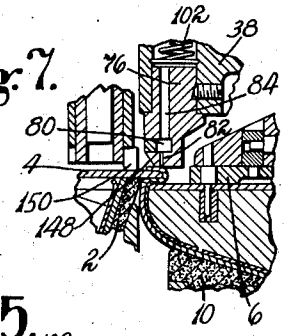


Fig. 6.

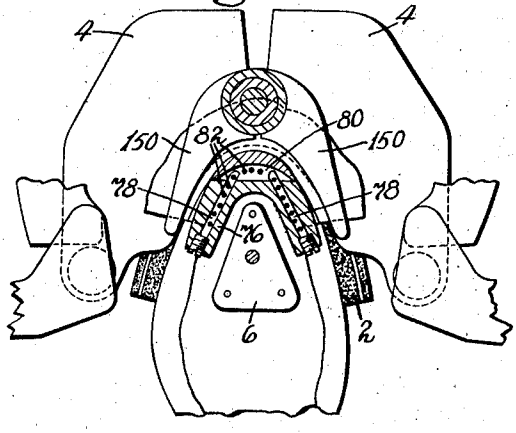
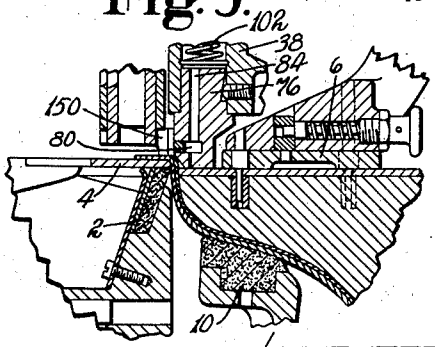


Fig. 5.



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UNITED STATES PATENT OFFICE

2,324,510

CEMENT-APPLYING MECHANISM

Bernhardt Jorgensen, Marblehead, Mass., assignor to United Shoe Machinery Corporation, Flemington, N. J., a corporation of New Jersey

Original application February 4, 1941, Serial No. 377,347. Divided and this application March 24, 1942, Serial No. 435,989

16 Claims. (Cl. 12—80)

This invention relates to cement-applying mechanism, this application being a division of a copending application of mine for Letters Patent for improvements in Machines for use in the manufacture of shoes, Serial No. 377,347, filed on February 4, 1941. An immediate object of the invention is to provide means for applying cement to shoes for use in securing the uppers in lasted relation to insoles, and the invention is herein illustrated as embodied in mechanism constructed for that purpose as part of the machine shown and described in the above-mentioned application, which is a machine for lasting the toes of shoes. It is to be understood, however, that the invention is not limited to that particular embodiment or to machines for lasting shoes.

With the above and other objects in view, the invention, in one aspect, provides a cement-applying device which is movable toward the work and which has novel means controlled by that movement of the device for delivering cement therefrom. As herein illustrated, the cement-applying device comprises a cement receptacle and a pump which are movable as a unit heightwise of a shoe into position to apply cement to the shoe, and mechanism for operating the pump to deliver cement in response to that movement of the pump and receptacle. More particularly, the construction shown includes a spring for operating the pump, means for subjecting the spring to stress by the movement of the device toward the shoe and mechanism also controlled by that movement for preventing operation of the pump by the spring until the device has arrived approximately in cement-applying position and for then rendering the spring effective on the pump.

The above and other features of the invention, including various novel details of construction and combinations of parts, will now be more particularly described with reference to the accompanying drawings and thereafter pointed out in the claims.

In the drawings,

Fig. 1 is a view in vertical section of a portion of the machine shown in the above-mentioned application, comprising cement-applying means in which novel features of the present invention are embodied, parts of the structure being broken away;

Fig. 2 is mainly a plan view of the structure shown in Fig. 1 and of other parts associated therewith;

Fig. 3 is a section on the line III—III of Fig. 2;

Fig. 4 shows in elevation, as viewed from the opposite side, the cement-applying means shown in Fig. 2 and further illustrates its relation to a shoe and to other parts shown in section before it has been moved into cement-applying position;

Fig. 5 is a view in vertical section illustrating the relation of the cement-applying means to the shoe after it has been moved into cement-applying position;

Fig. 6 is a view partly in plan and partly in section of the structure shown in Fig. 5, with the parts in the same relation to the shoe as in Fig. 5; and

Fig. 7 is a view similar to a portion of Fig. 5, but illustrating the positions of the parts at a slightly later time in the operation of the machine.

The machine shown in the previously mentioned application is a lasting machine having various lasting instrumentalities which cooperate to last the toe end of a shoe positioned bottom upward, including a toe former 2 (Figs. 4 and 6) which embraces the toe end of the shoe and wipes the upper heightwise of the last and wipers 4 which thereafter wipe the margin of the upper inwardly over an insole on the last. The machine includes also an upper-trimming device (not herein shown) which trims off the margin of all but the outer layer of the toe-end portion of the upper materials, leaving the margin of the outer layer outspread over the wipers as illustrated in Fig. 4. The shoe is positioned in proper relation to the lasting instrumentalities and to the cement-applying means hereinafter described by a member 6 which engages the bottom of the toe end of the insole and by a plurality of pins 8 which extend through holes in the insole into holes provided in the last. The operator mounts the shoe on the pins 8 with the insole in engagement with the member 6 prior to the starting of the cycle of power operations of the machine. After the starting of the machine a toe rest 10 is moved upwardly to clamp the shoe against the member 6 and to support it thereafter against downward movement during the operation of the machine.

Shortly after the point in the cycle of operations of the machine represented by Fig. 4 cement is applied to the shoe for securing the margin of the upper to the insole when the margin is thereafter wiped inwardly over the insole by the wipers 4. For this purpose there is provided

a cement-applying device 12 supported on a carrier 14 which also serves to support the above-mentioned upper-trimming mechanism, as fully disclosed in the previously mentioned application. The carrier 14 is clamped on a vertical hollow post 16 which is guided for vertical movements and for turning movements in a cylinder 18 inserted in a tubular portion 20 of the frame of the machine and is further guided by other means not herein shown. By the vertical movements of the post the trimming device and thereafter the cement-applying device are moved downwardly each into position to operate on the shoe, and by swinging movement of the carrier 14 accompanied by turning movement of the post the different devices are positioned respectively over the toe end of the shoe. Initially the carrier 14 is positioned as illustrated in Fig. 2 with the cement-applying device in a position in which it is not over the toe end of the shoe, this position of the carrier being determined by engagement of a bumper 22 thereon with an abutment 24 on the frame of the machine. Swinging movement of the carrier to carry the cement-applying device to a position over the shoe, in which position it is shown in Fig. 4, is effected after the upper-trimming operation by fluid-operated means not herein shown but fully disclosed in the previously mentioned application. Thereafter the cement-applying device is moved vertically downward by fluid-pressure means into position to engage the shoe and to apply cement to the shoe. For this purpose the upper end of the hollow post 16 is closed by a plug 26 which is threaded therein, and a disk 28 fastened to this plug serves as a holder for packing 30. The upper end portion of the post serves, therefore, as a piston in the cylinder 18, and by fluid admitted at the proper time to the upper end of the cylinder through a pipe 32 downward movement is imparted to the post to move the cement-applying device toward the shoe as above described. Such downward movement of the post is effected against the resistance of a spring 34 which serves thereafter to return it to its uppermost position determined by engagement of a bumper 36 on the carrier 14 with the lower end of the tubular portion 20 of the frame. Mechanism not herein shown but disclosed in the above-mentioned application is provided for limiting the downward movement of the post.

For purposes of this invention the cement-applying device 12, as herein illustrated, is so constructed as to adapt it for use to apply to the shoe thermoplastic cement maintained by heat in a liquid condition, although cement of a different kind may be used if desired. It includes a casting 38 having therein a cement-containing chamber 40. The casting 38, which thus serves as a cement receptacle, is supported directly by means of rods 42 and 44 on the front ends of upper and lower pairs of parallel links 46 and 48 the rear ends of which are mounted respectively on rods 50 and 52 on the carrier 14. The two upper links 46 are connected together by a web 54, and threaded in an ear 56 of this web is a screw 58 (Fig. 3) the lower end of which is acted upon by a compression spring 60 mounted in a socket in the carrier 14. This spring, therefore, tends to swing the links 46 and 48 downwardly, the limit of such downward movement of the links and of the casting 38 being adjustably determined by a screw 62 which is threaded in an ear 64 on one of the links 46 and is arranged to engage a vertical face on the carrier 14. The spring 60 is yieldable to permit any further downward movement of the carrier 14 which may take place after downward movement of the casting 38 is stopped by the shoe in the manner hereinafter explained. A cover 66 on the top of the casting 38 is removable to permit cement in a solid state to be introduced into the chamber 40. To melt the cement and maintain it in a liquid condition the casting 38 is heated by electrical heating units 68 (Fig. 2) mounted in bores formed therein, these units being supplied with current by wires mounted in conduits 70 leading from a junction box 72 on the carrier 14 to which current is supplied under control of a thermostat (not shown) connected by a capillary tube 74 to the casting 38.

Mounted in a bore in the lower end of the casting 38 is a cylindrical upwardly extending portion of a block 76 the lower portion of which is of horseshoe shape, as shown in Fig. 6, and is provided with two bores 78 communicating with each other through a chamber 80. This horseshoe-shaped portion of the block 76 is arranged to engage the marginal portion of the toe end of the insole and to act as a holddown thereon, and extending through it from the bores 78 and the chamber 80 are holes 82 through which cement is applied to the insole. The chamber 80 communicates through an upwardly extending bore 84 in the block 76 with a chamber 86 in the casting 38, and this chamber is arranged to communicate with another chamber 88 from which a passage 90 leads to the cement-containing chamber 40. Leading upwardly from the chamber 88 is a bore 92 in the casting 38 in which is mounted a plunger 94, the plunger cooperating with the adjacent wall of the casting to provide a pump. Normally closing the passage 90 is a ball valve 96 held on its seat by a spring 98 mounted between the valve and the lower end of the plunger 94, and normally closing communication between the chamber 86 and the chamber 88 is a ball valve 100 held on its seat by a spring 102. When the plunger 94 is moved upwardly it draws a certain amount of cement past the valve 96 into the chamber 88, and when it is moved downwardly it forces a corresponding amount of cement past the valve 100 into the chamber 86 and forces the same amount through the passage 84 and the holes 82 to apply the cement to the toe end of the insole. A port 104 in the casting 38 permits any cement which may leak past the plunger 94 to return to the chamber 40.

The plunger 94 is moved downwardly to deliver cement in the manner above described as a result of the downward movement of the carrier 14 to carry the cement-applying device toward the shoe. For this purpose there is mounted to swing about the previously mentioned rod 50 a lever 106 (Figs. 2 and 4) having a downwardly extending arm 108 provided with a roll 110 arranged to engage a relatively stationary plate 112 with which the machine is provided, the position of this plate being illustrated in Fig. 4. Prior to the downward movement of the carrier 14 the roll 110 is positioned a short distance above the plate 112, and in response to the downward movement of the carrier the roll is carried into engagement with the plate and then the lever 106 is swung about the rod 50 by the action of the plate on the lever during further downward movement of the carrier. Another arm 114 of the lever 106 carries a trunnion block 116 slidingly mounted on a rod 118 and engaging one end of a compression spring 120 the other end of which abuts

against a collar 122 fast on the rod. An enlarged front end portion of the rod 118 is connected by a pin 124 to a crank arm 126 fast on the previously mentioned rod 42 which serves as a rockshaft. The pin 124 extends through a slot 128 in the enlarged end of the rod 118 and is held normally at one end of the slot, as shown in Fig. 4, by a spring 130 mounted in the rod. Also fast on the rockshaft 42 is an arm 132 (Fig. 1) provided with a slot in which lies a pin 134 mounted in an upward extension of the pump plunger 94. It will thus be seen that rearward movement of the rod 118 (i. e., movement toward the right in Fig. 4) in response to the action of the compression spring 120 thereon serves to rock the shaft 42 in the direction to impart downward cement-applying movement to the pump plunger 94. The spring is prevented, however, from thus operating the rod until near the end of the downward movement of the carrier 14, notwithstanding the fact that the spring is being compressed at this time by the action of the lever 106. For this purpose there is pivotally mounted on the rod 50 a lever 136 one arm of which serves as a latch in engagement with the collar 122 on the rod 118, as illustrated in Fig. 4. This arm is swung upwardly to release the rod by engagement of the lever 106 with a screw 138 threaded in another arm of the lever 136 when the carrier 14 has nearly completed its downward movement as above described. It will be understood that adjustment of the screw 138 serves to vary the time in the downward movement of the carrier when the rod 118 is released. The amount of movement then imparted to the rod by the spring 120, and therefore the amount of cement-applying movement imparted to the pump plunger 94, is adjustably determined by a nut 140 threaded on the rod and a spacing collar 142 slidingly mounted on the rod between this nut and the trunnion block 116. It will be understood that the spacing collar abuts against the trunnion block and the nut abuts against the collar to limit the movement of the rod. The nut 140 is held in adjusted position by a lock nut 144. In the return of the parts to starting positions return movement is imparted to the rod 118 and the pump plunger 94 by the arm 114 of the lever 106, the trunnion block 116 on this arm acting on the rod through the collar 142 and the nut 140. It will be understood that at this time the rod 118 acts on the pin 124 through the spring 130, the slot 128 in the rod being provided for leeway in the swinging of the links 46 and 48, since the return movement of the arm 126 is limited by engagement with an abutment face of the casting 38. The return movement of the lever 106 is effected partly by gravity and partly by a spring 146 connected to the arm 114 of the lever and to one of the links 46.

The downward movement of the casting 38 toward the shoe is limited by engagement of the horseshoe-shaped lower end of the block 76 thereon with the insole, as illustrated in Fig. 5. This lower end of the block is provided with an inclined face 148 against which the marginal portion of the upper is forced by the wipers 4 when they are advanced and closed inwardly over the insole, and by the force thus applied to this face the block 76 and the casting 38 are wedged upwardly against the resistance of the spring 60 (Fig. 3), so that the wipers move inwardly under the block as illustrated in Fig. 7. The block 76 accordingly acts as a retarder on the margin of the upper to insure that it will be wiped tightly and smoothly inward over the insole by the wipers, and since the block 76 as well as the casting 38 is maintained in a heated condition, it serves to apply heat both to the cement on the margin of the insole and to the inner face of the margin of the upper, thus affording increased insurance that the thermoplastic cement will effectively secure the margin of the upper to the insole. In the construction shown the margin of the upper is further controlled, as more fully disclosed in the previously mentioned application, by an additional retarder supported on the carrier 14, this retarder comprising a pair of plates 150 for clamping the margin of the upper outspread on the top faces of the wipers in response to the downward movement of the carrier 14. The plates 150 are carried by an upwardly extending bar 152 which is supported on a pair of upper and lower parallel links 154 and 156 mounted to swing on the previously mentioned rods 50 and 52 and controlled by a spring 158 in the same way that the previously mentioned links 46 and 48 are controlled by the spring 60. The link 154 carries a screw 160 arranged to engage an abutment face on the carrier 14 to determine adjustably the height at which the retarder plates 150 are initially positioned. It will be understood that the spring 158 is yieldable to permit further downward movement of the carrier 14 after the upper is clamped on the wipers by the plates 150.

The manner of operation of the construction shown, in so far as it is of interest with reference to the present invention, will now be briefly summarized. At the proper time in the operation of the machine the carrier 14 is swung about its vertical axis to carry the cement-applying device 12 to a position over the toe end of the shoe, in which position it is shown in Fig. 4, the margin of the outer layer of the toe end of the upper being outspread at this time over the wipers 4 to permit cement to be applied to the margin of the toe end of the insole. In response to the admission of fluid to the cylinder 18 the carrier 14 is then moved downwardly to carry the cement-applying device toward the shoe and into engagement with the insole. In this downward movement of the carrier the roll 110 on the lever 106 is carried into engagement with the plate 112, after which, in response to further downward movement of the carrier, the lever is swung about the rod 50 to compress the spring 120. When the carrier has nearly completed its downward movement the lever 106 engages the screw 138 and swings the lever 136 to release the spring 120 and the rod 118 and thus to cause the spring to move the rod in a rearward direction. By this movement of the rod the pump plunger 94 is operated to force heated cement from the chamber 88 into the chamber 86 and to force cement from the latter chamber through the holes 82 in the horseshoe-shaped lower end of the block 76 and thus to apply the cement to the insole. The operative movement of the pump plunger is adjustably limited as hereinbefore described by the members 140, 142 and 116. When the heated block 76 engages the insole, as illustrated in Fig. 5, the margin of the upper is clamped in outspread position upon the wipers by the retarder plates 150 which are moved downwardly into such upper-clamping positions also by the downward movement of the carrier 14. The wipers 4 are next advanced and closed to wipe the margin of the upper inwardly over the insole, pulling the margin from under the

plates 150 and wedging the block 76 upwardly until it engages the margin on top of the wipers, as illustrated in Fig. 7. By their continued movement the wipers withdraw the margin of the upper from under the block 76 and wipe it fully down on the insole. It will be understood that as the margin of the upper is wiped inwardly under the block 76 this block serves to heat it and also to apply to it any cement which adheres to the lower face of the block. After the wipers have thus wiped the margin of the upper inwardly, fluid is released from the cylinder 18 to cause the spring 34 to lift the carrier 14 and thus to withdraw the cement-applying device from the shoe, after which the carrier 14 is swung back to its initial position determined by engagement of the bumper 22 with the abutment 24 (Fig. 2). In response to the upward movement of the carrier the spring 146 acts on the lever 106 to return the rod 118 to the position in which it is again held by the latch lever 136, thereby moving the pump plunger 94 upwardly to draw additional cement from the chamber 40 past the valve 96 into the chamber 88 ready to be forced from this chamber into the chamber 86 when the plunger is again moved downwardly.

Having described the invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a shoe machine, a cement receptacle having a cement-containing chamber, a pump located outside of said chamber, said receptacle and pump being movable as a unit toward a shoe heightwise thereof into position to apply cement to the shoe and reversely movable thereafter away from the shoe, means providing a passage leading from said chamber to the pump, a valve controlling said passage, and means for operating said pump to deliver cement in response to the movement of the receptacle and pump toward the shoe and for thereafter operating the pump to withdrawn cement from said chamber past said valve in response to the movement of the receptacle and pump away from the shoe.

2. In a shoe machine, a device for applying cement to a shoe, said device being movable heightwise of the shoe into cement-applying position and comprising spring-operated mechanism for delivering cement therefrom, said device comprising also retaining means for preventing said mechanism from operating until near the end of the movement of the device heightwise of the shoe and for then releasing it to render it operative in response to the movement of the device.

3. In a shoe machine, a cement receptacle and a pump movable as a unit heightwise of a shoe into position to apply cement to the shoe, a spring for operating said pump to deliver cement, and means for preventing said spring from operating the pump until near the end of the movement of the receptacle and pump heightwise of the shoe and for then releasing the spring to render it operative.

4. In a shoe machine, a device for applying cement to a shoe, said device being movable heightwise of the shoe into cement-applying position and comprising means movable to deliver cement therefrom, a spring for operating said delivery means, means for subjecting said spring to stress by engagement with one end thereof in response to the movement of the device heightwise of the shoe, and mechanism for controlling the other end of the spring to prevent the spring from operating said delivery means until the device has arrived substantially in cement-applying position and for then releasing that end of the spring to render it operative.

5. In a shoe machine, a device for applying cement to a shoe, said device comprising a pump movable heightwise of the shoe into cement-applying position and having a plunger for delivering cement therefrom, a spring for operating said plunger, means for subjecting said spring to stress in response to the movement of the pump heightwise of the shoe, and mechanism for preventing operation of the plunger by the spring until the pump has arrived substantially in cement-applying position and for then rendering the spring effective to operate the plunger.

6. In a shoe machine, a device for applying cement to a shoe, said device comprising a pump movable heightwise of the shoe into cement-applying position and having a plunger for delivering cement therefrom, a spring for operating said plunger, means for subjecting said spring to stress in response to the movement of the pump heightwise of the shoe, a latch for preventing the spring from operating the plunger until the pump has arrived substantially in cement-applying position, and means for then operating said latch in response to the movement of the pump to render the spring effective on the plunger.

7. In a shoe machine, a device for applying cement to a shoe, said device comprising a pump movable heightwise of the shoe into cement-applying position and having a plunger for delivering cement therefrom, a spring for operating said plunger, a lever for subjecting said spring to stress in response to the movement of the pump heightwise of the shoe, a latch for holding the plunger against movement by the spring until the pump has arrived nearly in cement-applying position, and means for then operating the latch by said lever to release the plunger in response to further movement of the pump.

8. In cement-applying mechanism, a cement-applying device comprising a pump movable toward the work and having a plunger for delivering cement therefrom, a spring for operating said plunger, and mechanism for releasing said spring when under stress to render it effective to operate the plunger in response to the movement of the pump toward the work.

9. In cement-applying mechanism, a cement-applying device comprising a pump movable toward the work and having a plunger for delivering cement therefrom, a spring for operating said plunger, means for subjecting said spring to stress in response to the movement of the pump toward the work, and mechanism also controlled by the movement of the pump toward the work for preventing said spring from operating the plunger while it is being subjected to stress and for then releasing it to render it operative.

10. In cement-applying mechanism, a cement-applying device comprising a pump movable toward the work and having a plunger for delivering cement therefrom, a spring for operating said plunger, means for subjecting said spring to stress as the pump is moved toward the work, and retaining means for holding said plunger in position to begin its delivery stroke while the spring is thus being subjected to stress and for then releasing the plunger to the action of the spring.

11. In cement-applying mechanism, a cement-applying device comprising a pump movable toward the work and having a plunger for deliver-

ing cement therefrom, a spring for operating said plunger, means for subjecting said spring to stress in response to the movement of the pump toward the work, and retaining means for holding said plunger in position to begin its delivery stroke while the spring is thus being subjected to stress and for then releasing it to the action of the spring in response to further movement of the pump toward the work.

12. In cement-applying mechanism, a cement-applying device comprising a pump movable toward the work and having a plunger for delivering cement therefrom, a spring for operating said plunger, a lever for subjecting said spring to stress in response to the movement of the pump toward the work, a latch for holding said plunger in position to begin its delivery stroke while the spring is thus being subjected to stress, and means for operating the latch by said lever to release the plunger also in response to the movement of the pump toward the work.

13. In cement-applying mechanism, a cement-applying device comprising a pump movable toward the work and having a plunger for delivering cement therefrom, a rod for operating said plunger, a spring for operating said rod, means for compressing said spring in response to the movement of the pump toward the work, a latch for holding said rod against movement by the spring while the spring is thus being compressed, and means to cause said latch to release the rod when the pump has arrived substantially in cement-applying position.

14. In cement-applying mechanism, a cement receptacle and a pump movable as a unit toward and from the work, said receptacle having a cement-containing chamber and the pump being located outside of said chamber, means providing a passage leading from said chamber to the pump, a spring-controlled valve normally closing said passage, and means controlled by such movements of the receptacle and pump for operating the pump to deliver cement as it is moved toward the work and for operating it to withdraw cement from said chamber past said valve as it is moved away from the work.

15. In cement-applying mechanism, a cement receptacle and a pump movable as a unit toward the work, a spring for operating said pump, and means for releasing said spring when under stress to render it effective thus to operate the pump in response to the movement of the receptacle and pump toward the work.

16. In cement-applying mechanism, a cement receptacle and a pump movable as a unit toward the work, a spring for operating said pump, means for subjecting said spring to stress in response to the movement of the receptacle and pump toward the work, and means for restraining said pump from operating while the spring is thus being subjected to stress and for then releasing it to the action of the spring.

BERNHARDT JORGENSEN.