July 21, 1931. W. V. NEAL 1,815,480

CEMENT APPLYING MACHINE

Filed March 23, 1928 4 Sheets-Sheet 1

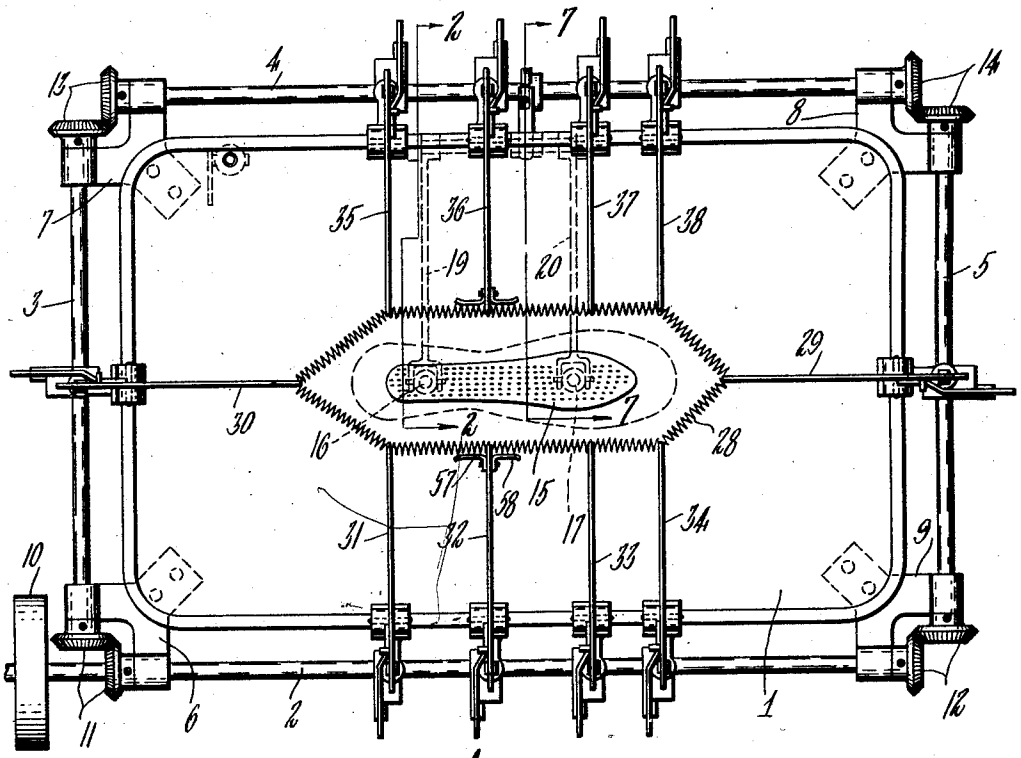


Fig. 1.

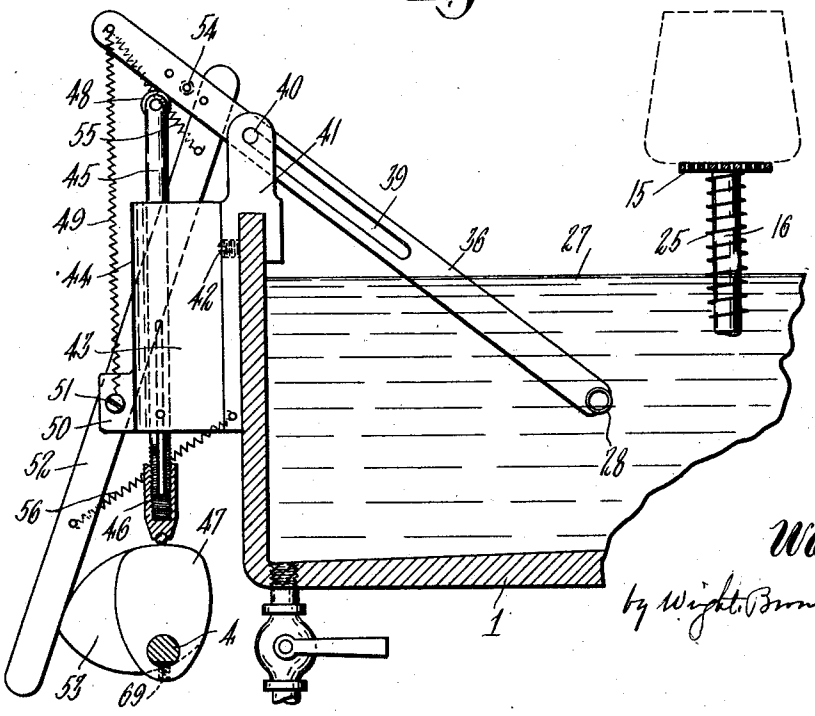


Fig. 2.

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July 21, 1931. W. V. NEAL 1,815,480

CEMENT APPLYING MACHINE

Filed March 23, 1928 4 Sheets-Sheet 2

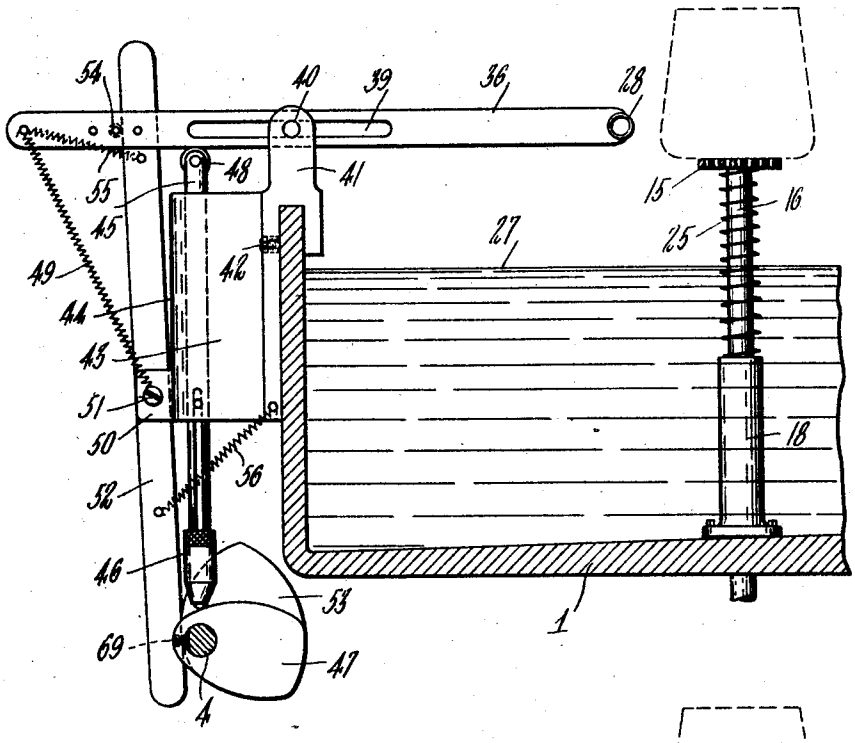


Fig. 3.

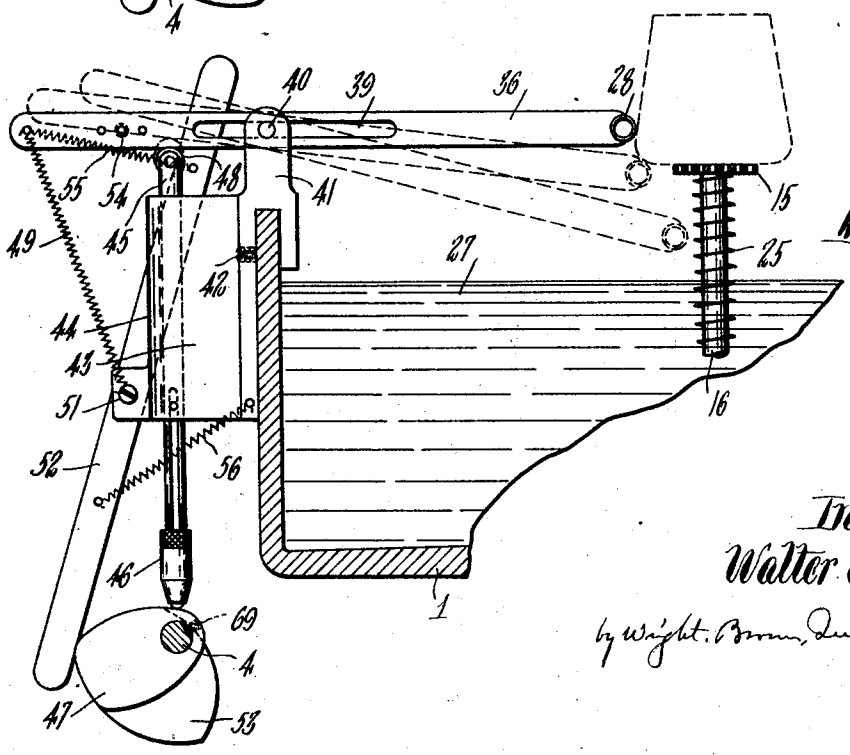


Fig. 4.

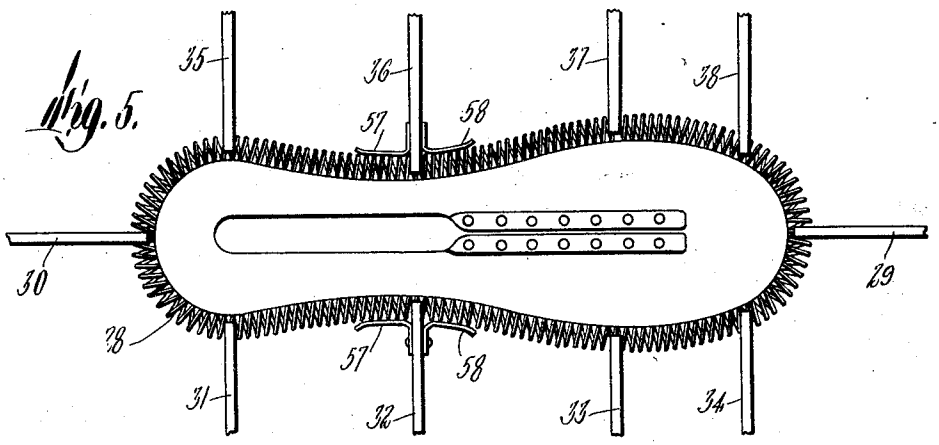
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July 21, 1931. W. V. NEAL 1,815,480

CEMENT APPLYING MACHINE

Filed March 23, 1928 4 Sheets-Sheet 3

Fig. 5.



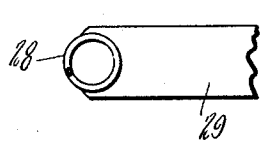


Fig. 8.

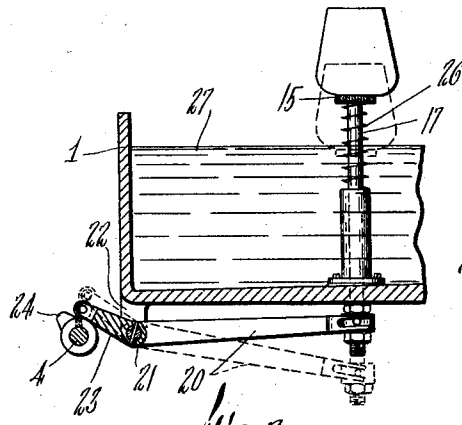


Fig. 7.

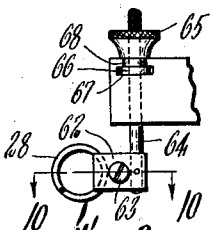


Fig. 9.

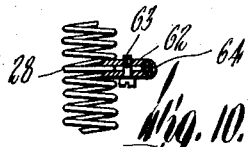


Fig. 10.

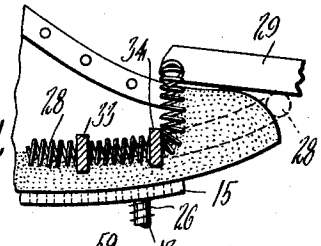


Fig. 11.

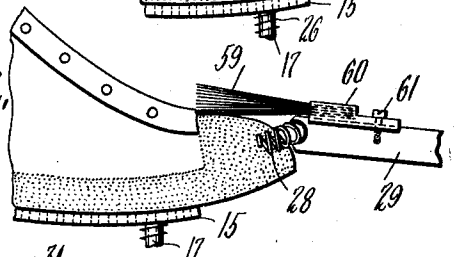


Fig. 12.

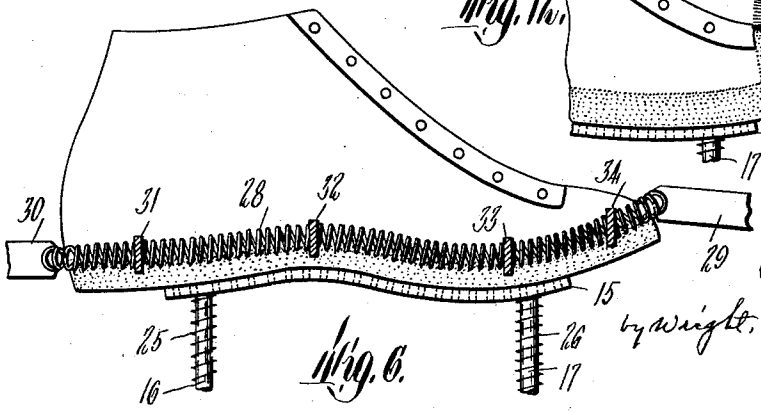


Fig. 6.

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July 21, 1931. W. V. NEAL 1,815,480

CEMENT APPLYING MACHINE

Filed March 23, 1928 4 Sheets-Sheet 4

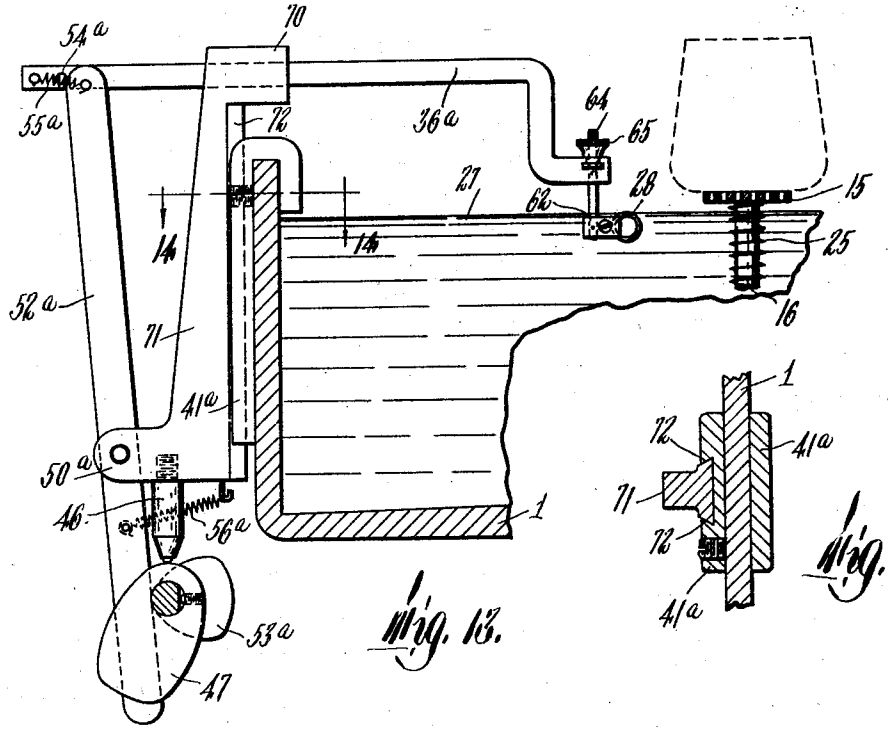


Fig. 13.

Fig. 14.

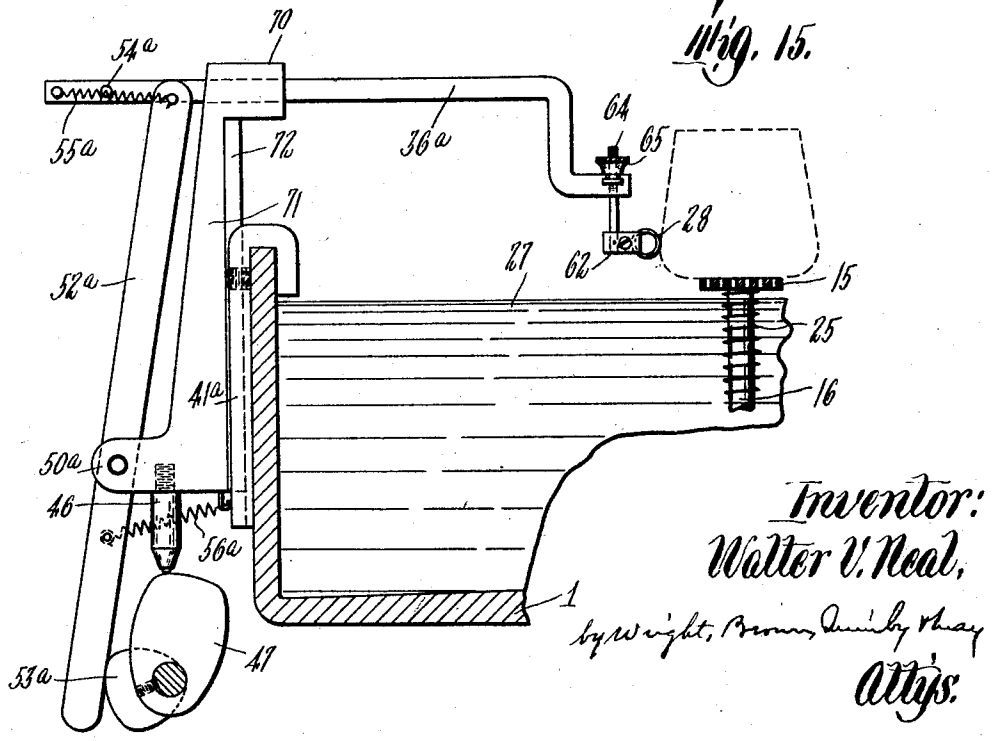


Fig. 15.

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Patented July 21, 1931 1,815,480

UNITED STATES PATENT OFFICE

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CEMENT APPLYING MACHINE

Application filed March 23, 1928. Serial No. 264,056.

This invention has for its primary and specific object to provide an automatic machine by which cement may be applied to the upper of a tennis shoe in a zone of any desired width, which may be even or uneven as desired, contiguous to the bottom of the shoe for uniting to the upper a strip of rubber, called in this art a foxing, which is also joined and united to the rubber sole of the shoe. Associated with this object is that of automatically coating the toe area over which a rubber toe cap is later to be applied, and the further object of coating the bottom of the partially completed shoe, prior to the application of the rubber outer sole, with cement for uniting the outer sole thereto.

The invention, however, is not limited to this specific object and use, but in its generic aspect, the object is to effect automatically the coating of the sides, or both the bottom and sides (including within the meaning of the term "sides" either the whole circuit or a part only of the circuit) of various articles with any liquid or semi-liquid material.

The invention consists in means for supporting the article to be coated and the combination therewith of mechanism operating a cement applying tool or tools and automatically operated to dip the tool or tools into a body of the liquid coating composition and then apply the tool or tools against the article to be coated at the area prescribed to receive the coating. It further comprises an automatic means for lowering and raising the support for the article, in order to dip the bottom of the article in the coating composition. It further comprises the particular means or mechanisms herein disclosed organized and adapted to apply cement to the sides of a tennis shoe adjacent to the bottom thereof and to the upper side of the toe part of the shoe, and to dip the shoe bottom slightly into the cement.

A form of the invention embodied in a machine for coating the sides and bottom of a partially completed tennis shoe is presented in the following specification and in the drawings accompanying the same for illustration of the principles and characteristics above referred to, but without intent to limit the scope of the invention or the protection which I seek otherwise than as required by the meaning of the appended claims when construed with reference to the prior art.

In the foregoing general statement and in the following detailed description, the terms "rubber" and "cement" are used in reference to parts of a shoe and to the coating composition. The term "rubber", as applied to the parts of the shoe, means and includes any composition containing any proportion of rubber as an ingredient suitable for use in the making of rubber soled shoes. As applied to a cement, the term "rubber" signifies a solution containing rubber suitable for uniting strips or layers of rubber composition to other parts. The term "cement" means any liquid or semi-liquid adhesive; and as used descriptively in the title of this invention, it includes also any other liquid which is analogous to such cement in the sense that it can be applied by the instrumentalities described herein.

Referring to the drawings,—

Fig. 1 is a plan view of a cement-applying machine embodying this invention;

Fig. 2 is a partial cross section taken on line 2—2 of Fig. 1 and shown on a larger scale;

Fig. 3 is a similar view to Fig. 2 but showing the cement-applying instrumentalities in different position;

Fig. 4 is similar to Figs. 2 and 3, showing the cement-applying instrumentalities in still another position;

Fig. 5 is a detail plan view showng the cement-applying instrumentalities in action;

Fig. 6 is a side elevation of the shoe and cement-applying means shown in Fig. 5;

Fig. 7 is a fragmentary sectional view taken on line 7—7 of Fig. 1 illustrating the means for raising and lowering the shoe support;

Figs. 8, 9 and 10 are fragmentary views illustrating details of construction of the cement-applying tool, including two alternative forms;

Figs. 11 and 12 are fragmentary elevations showing the toe part of the shoe and

cement-applying instruments of two alternative forms for applying cement to that part of the shoe upper which is covered by a toe cap;

Fig. 13 is a view similar to Fig. 2 illustrating an alternative mechanism for operating the cement-applying tool;

Fig. 14 is a horizontal section on line 14—14 of Fig. 13, showing a detail of construction;

Fig. 15 is a view similar to Fig. 13 showing the mechanism in a different position.

Like reference characters designate the same parts wherever they occur in all the figures.

Shoes of the type referred to in this specification as tennis shoes are those which have an upper, either a high or a low upper, of some material or fabric other than rubber, usually cotton duck or a similar textile fabric, and an outer sole of rubber. Such shoes usually include a so-called foxing of rubber, which is a strip about one-half or three-fourths of an inch wide, united to the edges of the sole and extending upward to the limit of its width, all around the circuit of the upper, to which it is united by a suitable cement before vulcanization. Heretofore in the commercial manufacture of such shoes the coating of cement applied to unite the foxing to the sides of the upper has been applied by hand with the aid of a brush, the workman dipping the brush in the cement and passing it rapidly around the outline of the partly completed shoe adjacent to the bottom, so holding one of his fingers that it projects under the shoe bottom and serves as a guide or gage to limit the width of the zone or strip of the cement applied by the brush. The necessities of economical manufacture have required this operation to be performed as rapidly as possible, precluding the expenditure of enough time by the operator to make sure that the coating strip is of sufficient but not too great width and is unbroken and of uniform thickness throughout. It follows from these practically unavoidable time limitations that frequently the cement is smeared beyond the boundary of the area to be covered by the foxing, in some places, defacing and soiling the upper, and in other places is lacking to such an extent that the desired close and secure union between the upper and foxing fails to be secured in vulcanization. And even when most rapidly and skillfully performed, this operation is relatively slow.

My object, in the application of this invention to the class of manufactures here indicated, has been to perform this operation mechanically, with certainty that the cement will not run over the limit line, with better assurance of an adequate thickness of coating in all places required to be coated, and with completion of the operation in a much shorter time than is required for the hand coating operation; resulting in a better product with a smaller expenditure of time. A part of the same object has been to extend the coating over the toe part of the upper far enough to serve as a bond for a toe cap. Another object has been to enable the bottom of the partly completed shoe to be coated with cement in the course of the same handling which results in the coating of the sides.

Now describing in detail the particular embodiment of the invention chosen for illustration, 1 represents a tank adapted to contain a liquid cement of the character suitable for the operation in view, which tank may be set on a table, bench or any other supporting structure of suitable character, not shown. Shafts 2, 3, 4 and 5 are mounted in bearings forming parts of brackets 6. 7, 8 and 9, which are secured to the bottom of the tank at the corners and project therefrom, the brackets being branched and locating their respective bearings so that the shafts extend generally parallel to the four sides of the tank, as shown in Fig. 1. A belt pulley 10 is mounted on the shaft 2 for driving it and power is delivered from this shaft to the shafts 3 and 5 by pairs of mitre gears 11 and 12, respectively. The shafts 3 and 5 drive the shaft 4 in turn by similar pairs of mitre gears 13 and 14. Thus all the shafts are rotated simultaneously and in unison.

It may be observed that the outline of the tank and the specific arrangement of shafts and means for mounting them may be varied without departing from the principle embodied in the mechanism as here described, such principle being the provision of operating shafts and cams arranged about the circuit of the article to be coated.

A support 15 for the shoe to be coated is located in the middle of the tank, being supported by posts 16 and 17 rising through the bottom of the tank and the body of cement contained therein, passing also through guides 18 fixed to the box bottom and serving as stuffing boxes to prevent leakage of the cement. These posts beneath the tank bottom are coupled to arms 19 and 20, shown in Figs. 1 and 7, which are made fast to a rock shaft 21 turning in brackets 22 secured to the bottom of the box. Also secured to the same rock shaft is an operating arm 23, the end of which overlies the shaft 4 and is movable by a cam 24 thereon to pull the posts 16 and 17 downward. These posts and the shoe support are normally raised by springs 25 and 26 surrounding the posts and confined between their guides and the supporting plate 15.

A sufficient quantity of cement, 27, is maintained in the tank to rise to a height slightly above the position reached by the support 15 when depressed as described, whereby the plate is then entirely submerged, but carried to only a short distance below the sur-

face. Hence a shoe, placed on the support and allowed to descend with it, is dipped at its bottom into the cement and then there becomes coated. Preferably the plate is perforated with numerous holes of sufficient size to permit flow of the cement to those parts of the shoe bottom which overlie the support, as indicated by Fig. 1 and by the sectional views in which the support appears.

Dipping alone is not effective to place a film of cement, in a band of the desired width, on the sides of the shoe upper adjacent to the bottom, because the bottom of a shoe is not flat. Hence I have devised a tool for raising the cement, and means for so shaping the tool, or positioning the several parts thereof, that these various parts will apply the cement at points variously distant from a given horizontal plane; or, in other words, at points equally distant from the edge of the shoe bottom when the bottom has an undulating formation in profile. The tool adopted for this purpose and here illustrated is a spring helix of wire shown at 28, the ends of which are brought together so as to make a closed figure, and different parts of which are made fast to operating arms at different sides of the tank. An arm 29 is thus connected with that part of the tool which crosses one end of the shoe, say the toe end; and an arm 30 is so connected to the helix adjacent to the opposite end of the shoe. Arms 31, 32, 33 and 34 are connected to the tool at separated parts along one side, and arms 35, 36, 37 and 38 are connected to the tool at the opposite side. There may be any desired number of such arms connected at any desired points on the helical spring tool, the number and locations of the arms being determined by the contour of the article and being permissibly different for other articles than for shoes. But approximately the arrangement shown in these drawings is suitable for shoes of a considerable range of sizes. Adjustment of the position of the arms and shifting of their points of connection with the helical wire tool are permitted to adapt the tool for shoes of different sizes and contours. The arms 31, 32, 33 and 34 are supported on the rim of one side of the tank and are operated by cams on the shaft 2. Arms 35, 36, 37 and 38 are supported on the rim of the opposite side of the tank and operated by cams on the shaft 4; while arms 29 and 30 are supported on the opposite end walls of the tank and operated by cams on the shafts 5 and 3, respectively. The several arms, their supporting means, and the mechanisms for operating them are all substantially alike, wherefore a description of one will suffice for all. Such description follows with respect to the arm 36 shown in detail in Figs. 2, 3 and 4.

The arm has a longitudinal slot 39 receiving a pivot pin 40 mounted in a bracket 41 which straddles the rim of the tank and is made fast thereto by the set screws 42. The arm is thus adapted to move angularly and lengthwise with respect to the pivot. Secured to the outer side of the bracket, either as an integral part thereof or in any suitable way, is a web 43 having a vertical guideway 44 in which a rod 45 is mounted to slide endwise. On the lower end of the rod 45 is an adjustable foot 46, engaged by a screw thread so that it may be adjusted to lengthen or shorten the effective length of the rod. This foot rests on a cam 47 secured to shaft 4. The upper end of the rod 45 carries a roll 48 which underlies and engages the lower edge of the arm 36. A spring 49 is connected to the outer end of arm 36 and is anchored to a part of bracket 41, preferably to a lug 50 thereon, by means of a screw 51, which also serves as a pivot for a lever 52. Lever 52, pivoted at 51, engages a cam 53, also fixed on shaft 4, and rises to a position beside arm 36, in position to engage a pin or stud 54 projecting from the adjacent side of arm 36 to a point between the outer end of the latter arm and the location of the adjacent part of lever 52. A spring 55 is connected to arm 36 and lever 52 and consequently exerts force tending to move the arm 36 inward, with respect to the tank, and to move the upper arm of lever 52 outward; such movement of the lever, however, being resisted by the engagement of its lower arm with cam 53. A spring 56 is connected with the lower arm of lever 52 and anchored to a fixed point on the bracket, and also exerts force tending to hold the lever against the cam.

It will now be apparent that the cam 47, acting through rod 45, and the spring 49 cooperate to swing the arm 36 in a vertical plane about the pivot 40; and that the cam 53, cooperating with the spring 56, rocks the lever 52 in and out. The lever 52, alternately pressing against the stud 54 and pulling through spring 55, moves the arm 36 endwise. The cams 47 and 53 are so timed as to give the following cycle of movements to the arm 36. Raising rod 45 and swinging the lower arm of lever 52 outward, they pass the end of the arm 36 which is connected to the cement applying tool downward and inwardly into the body of cement, as shown in Fig. 2. The receding surfaces of both cams then coming into action, the spring 56 swings the lever 52 so that its upper end moves outward, and spring 49 pulls the outer end of arm 36 downward, so that the tool is raised out of the cement and brought to a position beside the location of the shoe, but clear of it, and at that height above the supporting platform which has been determined as the height of the zone to be coated on the shoe upper. This position is shown in Fig. 3. A low dwell on cam 47 then leaves the lifter rod 45 in the same position while a rising

surface on cam 53 moves the rock lever 52 to carry its upper arm inward and pull the arm 36 toward the shoe, the spring 55 yielding when the tool reaches the shoe and the lever continues to move. This relationship is shown by full lines in Fig. 4. Then a high dwell on cam 53 holds the lever 52 in this position while a rising surface on cam 47 lifts the rod 45 and causes the tool to wipe downward over the side of the shoe, the spring 55 causing the tool to press against the side of the shoe upper while following the contours thereof, until it passes below the bottom of the shoe, as shown by broken lines in Fig. 4. Continuing rotation of the cams brings the parts again into the position shown in Fig. 2 and causes the cycle to be repeated.

It is to be understood that the cam 24 which governs the rise and descent of the shoe support is so timed as to cause the support to reach its raised position before the cement applying tool passes from the position of Fig. 3 to that shown in full lines in Fig. 4. The operator, taking a shoe which is ready for the cementing action, places its bottom on the support and holds it there while the support descends and rises, and until the tool 28 has applied cement to its sides and has passed into the lowest position shown by broken lines in Fig. 4. He then removes the cement coated shoe and places another shoe on the support. In order to make the time of the complete cycle short enough, without at the same time causing any of the movements to be too rapid or abrupt, the cam 24 may be so timed and formed as to lower the support during the downward wiping motion, or a part of such motion, of the applying tool; the descent of the support then being arrested before the tool reaches its lowest position, or taking place at a slower rate than descent of the tool, to effect the relative movement necessary to cause the tool to wipe across the zone to be coated.

The entire cycle of the machine may be timed at a rate which permits the operator to pick up shoes from a rack beside him, place them in the machine and hold them as described while being cemented and place the cemented shoes on another rack continuously. But it may also be provided with an automatic starting and stopping mechanism which, upon movement of a treadle or handle, will cause the machine to start, perform one cycle, and then stop automatically. Such starting and stopping mechanisms are well known in connection with machines for performing operations on shoes and parts of shoes, and I may use any of such mechanisms here. It is not shown or described, however, as it is not essential to the explanation of the new and original features of this invention, or to the operation of the machine.

The cement applying tool, formed of a wire helix as described, is well adapted to the purpose of lifting cement and applying it to a shoe. It holds the cement not only by adhesion on the outer surface of its coils, but also in the spaces between and surrounded by the coils, from which it is drawn by its viscosity when the tool is wiped over the surface of the shoe. Thus it is adapted to carry a sufficient charge of the cement for adequately supplying the shoe, and to deliver the cement freely enough to make a suitable coating. The flexibility and elasticity of this tool enable it to stretch, as the parts which pass around the ends of the shoe are pulled outward in rising from the body of cement and reaching positions beside the article to be coated; while its contractile resilience causes it to hug the periphery of the shoe as is permitted by inward movement of its controlling arms. Those parts of the tool which engage concave parts of the shoe outline, namely, the shank part, are pushed into these concavities by the arms 32 and 36, and these arms are preferably provided also with laterally projecting pressure applying leaf springs 57 and 58 arranged to give the tool a gradual concave curvature and press it with yielding force against the concave surfaces of the shoe at either side of the points alined with the arms 32 and 36. The manner in which the tool thus hugs the shoe and engages every point in its horizontal contour is illustrated in Fig. 5.

The tool is caused to assume an alinement similar to the undulating profile of the shoe bottom by adjusting the length of the several lifter rods 45 which operate the respective carrying arms, so that some points of the tool will be placed at a higher elevation than others, as shown in Fig. 6. The elastic and resilient nature of the helix which forms the tool causes it to extend with gradual curvature between arms at different heights and to reverse its direction of curvature equally gradually. Thus, by providing a sufficient number of arms suitably disposed, the tool is positioned to make its first contact with the shoe upper on lines spaced apart equal distances at all points from the edge of the shoe bottom, or in any other location required to conform to the width of the foxing which is to be applied to the shoe. The boundary of the cemented zone is thus definitely established in sufficiently exact conformity with the edge of the foxing, and danger of the cement being smeared on the upper beyond the limit of the foxing is avoided.

In cases where a toe cap of rubber is applied to the upper, I may cement coat the area to be covered by the toe cap by causing the arm 29, which controls the toe end of the applying tool, to be moved additionally upward and backward over the toe end of the upper, as shown in Fig. 11. Such additional movement may be given by adjusting the

foot of the lifter bar 45 for the arm 29 upward on the bar to such an extent that the spring 49, pulling down on the outer end of this arm will lift its inner end to the extent required. The lever which gives the in and out movement to the arm, operates with enough lost motion, as indicated by Fig. 4, to carry the inner end of the arm 29 over the toe of the shoe to the required distance.

But instead of applying cement to the toe cap receiving area in the manner just described, an auxiliary tool, in the nature of a brush 59 may be provided, as shown in Fig. 12. Such brush is applied to the arm by a holder 60 and a screw 61 so that it overlies the toe part when the helix bears on the extremity of the toe. The brush is dipped into the cement when the arm is dipped and becomes saturated with cement. On being moved downward with the arm from the position shown in Fig. 12, it spreads and wipes the cement over the upper surface and both sides of the toe.

The helical cement applying tool may be connected with its operating arms by various means. One mode of connection shown in detail in Fig. 8 consists in making each arm with a wide notch or recess in its end shaped to fit the helix and having an open mouth of less width than the diameter of the helix. The latter, being elastically contractible in diameter, may be readily placed in such notch, and expands within it, becoming firmly seated and securely held therein.

Another connecting means consists of a clip 62, shown in Figs. 9 and 10, having jaws which embrace one of the coils of the helix, passing between this coil and the adjacent coils at either side, and being clamped upon it by a screw 63. The clip is made fast by an anchor pin or otherwise to a rod 64 which passes through an upright hole in the arm and receives an adjusting nut 65 on its protruding threaded part. The nut is provided with a collar 66 seated in a chamber in the arm intersecting the hole through which the rod 64 passes, and being overlapped by lugs 68 on the arm. The clip may indeed be made integral with the arm, by slotting the end of the arm so that jaws, like those of the clip are formed, and a clamp screw like screw 63 may be passed through such jaws.

It will be noted that the cams 47 and 53 are formed with perforations through which their carrying shafts extend, and that they are made fast to the shaft by set screws, one of which is shown dotted at 69 in Figs. 2, 3 and 4. Thereby the cams are made adjustable both angularly about the shaft and longitudinally thereof. Likewise the brackets which support the several arms and their actuating means are adjustable along the walls of the tank on which they are mounted. These provisions for adjustment enable as many arms to be located at each side of the article to be coated as may be needed in any case, and to be located in the positions where they best serve their purpose. Being detachably connected to the cement applying helix, these arms may be connected to the latter at any desired points. The movements of each of them may be timed, by angular adjustment of their respective operating cams, so as to occur simultaneously or in any desired sequence with the other arms.

Variations in the construction and arrangement of the operating mechanisms may be made without departing from the invention. One of such variations is shown in Figs. 13, 14 and 15. Here the operating arm 36*a* is movable bodily, inward and outward, in a guideway 70 which is carried by a slide 71 having a dovetail rib 72 arranged to travel up and down in a guideway in the bracket 41*a*. This bracket corresponds to the bracket 41 and is adjustably mounted on the wall of the tank in the same way as the latter. The slide 71 has an adjustable foot 46 like the foot of the lifter rod 45, engaging and operated by the cam 47. The lever 52*a* is pivoted in a lug 50*a* on the slide 71 and is actuated by a cam 53*a*. It applies movement to the arm 36*a* through a stud 54*a* and spring 55*a* in the same manner as the lever 52 previously described. It is drawn back and held in contact with its cam by a spring 56*a*.

The movements of the cement applying tool given by this last described mechanism are essentially the same as previously explained. The tool is dipped into cement and spread outward away from the shoe placed on the supporting rest, raised, moved inward and contracted to embrace and bear on the shoe, and then wiped downward along the lower part of the shoe upper and dipped into the cement again.

The above described variation does not exhaust the possibilities of modifications in structure and arrangement of parts which may be made within the scope of the invention. Neither is the description of use and purpose, as being particularly concerned with shoes, for the specific purpose of applying cement to unite a rubber foxing to a fabric upper, a limitation as to the purposes and uses to which the invention may be applied within the scope of my claims.

What I claim and desire to secure by Letters Patent is:

1. A machine of the character described comprising a support adapted a hold an article to be coated rising above the surface of a body of coating liquid, a tool for applying liquid, and automatic mechanism for moving said tool in a cycle downward into the liquid, upward out of the liquid at a distance from the article, toward the article, then laterally and downward.

2. A machine of the character described comprising a support adapted to hold an ar-

ticle to be coated rising above the surface of a body of coating liquid, a tool for applying liquid, and automatic mechanism for moving said tool in a cycle downward into the liquid, upward out of the liquid at a distance from the article, toward the article, and downward, said means including a yieldable element arranged to yield when the tool contacts with the article in the course of its movement toward the latter and to hold the tool in contact with the article during the subsequent downward movement of the tool.

3. A machine for applying liquid in a continuous band to the slide of an article of irregular contour comprising a support for the article to be coated arranged to hold such article above a body of the coating liquid, a flexible elongated liquid applying tool, a plurality of operating arms connected to said tool at different points, and means for moving said arms in substantial unison and in a cycle which brings the tool connected to them into the body of liquid, upward out of the liquid at a distance from the article, and then toward the article into contact therewith and then along the surface of the article while remaining in such contact.

4. A machine for applying a liquid coating material comprising a tank adapted to hold such material, a flexible and extensible elongated liquid applying tool forming a closed outline, arms supported outside of the outline of such tool connected thereto at separated points throughout the circuit of such outline, and operating means for the several arms organized to move them in substantial unison in a cycle which comprises downward, upward, outward and inward movements.

5. A machine for applying a liquid coating material comprising a tank adapted to hold such material, a flexible and extensible elongated liquid applying tool forming a closed outline, arms supported outside of the outline of such tool connected thereto at separated points throughout the circuit of such outline, and operating means for the several arms comprising a cam and transmission means for each arm arranged to move the arms up and down, a second cam for each arm, and a lever interposed between the second cam and arm for moving the arm inward and outward.

6. A machine for applying liquid to the sides of an article comprising a tank adapted to hold such liquid, a support for the article to be coated arranged to hold the article with its sides rising above a given level, an applying tool consisting of an elongated, slender, flexible and elastically extensible member forming a closed outline, arms extending inward from different sides of the tank connected to said member and being positioned to hold the same so that it surrounds the location of said support, and mechanism for moving said arms in unison to dip the applying tool below the before mentioned level, stretch it to clear the sides of the article placed on said support, raise it above such level and permit its contraction into contact with the sides of the article, and move it along the sides of the article while in contact therewith.

7. A cement applying means comprising a tank adapted to contain cement, a support for articles to be coated located within the circuit of the walls of said tank, a plurality of arms mounted on different walls of the tank with provision for movement both up and down and in and out, said arms extending toward the support, an applying tool comprising a helix of spring wire connected to the inner ends of said arms in a closed outline surrounding the location of said support, and means for moving the arms and applying tool up and down and in and out.

8. A cement applying means comprising a tank adapted to contain cement, a support for articles to be coated located within the circuit of the walls of said tank, a plurality of arms mounted on different walls of the tank with provision for movement both up and down and in and out, said arms extending toward the support, an applying tool comprising a helix of spring wire connected to the inner ends of said arms in a closed outline surrounding the location of said support, and means for moving the arms and applying tool up and down and in and out, the parts of said means which cause the inward movement of the arms including elastic and yieldable connections adapted to yield when the tool makes contact with the sides of the article held on said support in the course of inward movement of said arms.

9. A machine of the character described comprising a tank adapted to contain cement, a support for the articles to be cemented arranged in said tank, means for raising and lowering said support above and below the level of a body of cement in the tank, and means for applying cement to the sides of such article in a zone, the upper boundary of which is above such level and different points of which are at different heights.

10. A machine of the character described comprising a tank adapted to contain cement, a support for the articles to be cemented arranged in said tank, means for raising and lowering said support above and below the level of a body of cement in the tank, and means for applying cement to the sides of such article in a zone, the upper boundary of which is above such level and is otherwise than horizontal, said means including a plurality of arms, a flexible tool connected to said arms and extending between them, means for raising and lowering the arms to dip the tool into the cement and lift it above the level of the cement, the portions of the tool connected to different arms being at different heights when so raised, and

means for placing and holding the tool in contact with the side of an article when above the cement level.

11. In a machine of the character described, a tank, a plurality of arms mounted on the walls of the tank to extend over the interior thereof, a flexible applying tool connected to the ends of said arms and extending between them, means for raising and lowering those parts of the arms to which said tool is connected, different arms being so raised to different heights, and means for causing inward and outward movements of the arms.

12. In a machine of the character described, a tank, a plurality of arms mounted on the walls of the tank to extend over the interior thereof, a flexible applying tool connected to the ends of said arms and extending between them, means for raising and lowering those parts of the arms to which said tool is connected, different arms being so raised to different heights, and means for causing inward and outward movements of the arms arranged to effect such inward movements when those parts of the arms to which the tool is connected are raised.

13. In a machine of the character described, a tank, an operating arm, a cement applying tool carried by said arm, means for raising and lowering the part of the arm to which said tool is connected, and means for moving the arm inward and outward with respect to the adjacent wall of the tank comprising a cam, a lever engaged with said cam, an abutment on the arm engageable by outward movement of the lever to move the arm outward, and a resilient connection between the lever and arm arranged to transmit force yieldingly from the former to the latter in the inward direction.

14. In a machine of the character described, a tank, an arm supported to extend across a wall of said tank into the area within the circuit of the tank walls, a cement applying tool carried by the inner end of said arm, means for so moving said arm as to raise and lower its inner end and the tool carried thereby, said means being adjustable to elevate the arm to a greater or less height, a lever arranged to oscillate in an inward and outward direction with respect to the wall of the tank and having a portion adjacent to said arm, a spring connected to the arm and lever arranged to exert force yieldingly upon the arm in the inward direction, and an abutment on the arm arranged to be engaged by the lever to transmit force positively to the arm in the outward direction.

15. In a machine of the character described, a cement applying tool consisting of a spring wire helix in a closed outline combined with operating means for expanding and contracting said tool and for moving it up and down.

16. In a cement applying machine, a flexible elongated applying tool, combined with supporting and operating arms connected to said tool at separated points throughout the length thereof, and means for moving those parts of the arms which are so connected to the tool both inward and outward and also up and down; one of said arms having a laterally projecting spring arranged to apply force yieldingly on the outer side of the tool.

17. A machine for applying liquid to the sides of an article comprising a tank adapted to hold such liquid, a support for the article to be coated arranged to hold the article over the liquid in the tank, an elongated applying tool of flexible construction, a plurality of carrying arms for said tool connected to the same at different points along the length thereof, and operating means for said arms organized to lower the arms with the tool into the liquid, raise them from the liquid and bring them into contact with the sides of the article; said operating means being constructed to bring different parts of said tool into contact with the article at different heights above the level of the liquid.

18. A machine for applying liquid to the sides of an article comprising a tank adapted to hold such liquid, a support for the article to be coated arranged to hold the article over the liquid in the tank, an elongated applying tool of flexible construction, a plurality of carrying arms for said tool connected to the same at different points along the length thereof, and operating means for said arms organized to lower the arms with the tool into the liquid, raise them from the liquid and bring them into contact with the sides of the article; said operating means being organized to exert force yieldingly on the arms in the direction toward the article, whereby the arms are enabled to bring the tool into contact with more or less protuberant parts of the article.

19. A machine for applying cement to a shoe upper comprising a tank adapted to hold cement, applying means comprising flexible elongated portions adapted to bear on the sides of a shoe placed between them and extensible portions adapted to embrace the toe and heel parts of the shoe, lateral arms extending inward from opposite sides of the tank connected to the first named applying portions at separated points, other arms extending inward from the intermediate sides of the tank connected to the toe and heel portions of said applying means, and mechanism for moving said arms up and down, and inward and outward, in paths which cause them to extend the applying means to an outline larger than that of the shoe, dip the applying means into the cement, and bring

the applying means into contact with all sides of the shoe adjacent to the bottom.

20. A shoe cementing machine comprising a tank adapted to contain liquid cement, arms projecting inward from the different sides of the tank, applying means connected to said arms and adapted to surround the shoe to be cemented, a tool connected to one of said arms for wiping over the toe cap area of a shoe upper, and mechanism for raising and lowering said arms and moving them inward and outward in substantial unison.

21. A shoe cementing machine comprising a tank adapted to hold cement, a support for a shoe rising from the bottom of said tank and normally located above the level of liquid therein, means for raising and lowering said support whereby to dip the bottom of a shoe placed thereon in the cement, lateral cement-applying means adapted to bear on the sides of the shoe upper adjacent to the bottom, arms connected to said lateral cement-applying means at different points thereof and being movable inwardly and outwardly from different sides of the tank toward and away from said support, and means for so moving said arms and also raising and lowering them to dip the applying means in the cement; and a tool carried by one of said arms adapted to wipe over the toe cap area of the shoe upper.

22. A shoe cementing machine comprising a tank adapted to hold cement, a support for a shoe rising from the bottom of said tank and normally located above the level of liquid therein, means for raising and lowering said support whereby to dip the bottom of a shoe placed thereon in the cement, lateral cement-applying means adapted to bear on the sides of the shoe upper adjacent to the bottom, arms connected to said lateral cement-applying means at different points thereof and being movable inwardly and outwardly from different sides of the tank toward and away from said support, and means for so moving said arms and also raising and lowering them to dip the applying means in the cement; said lateral applying means being flexible and certain of the arms being raised to different heights, and the operating means for the arms including springs through which the action of moving the arms inward is yieldingly transmitted, whereby said lateral applying means is conformed to the periphery of the shoe on lines at opposite sides thereof generally similar to the profile of the shoe bottom.

In testimony whereof I have affixed my signature.

WALTER V. NEAL.