No. 675,007. Patented May 28, 1901.

A. E. JOHNSON.

MACHINE FOR SPREADING LIQUID CEMENT.

(Application filed Nov. 12, 1900.)

(No Model.) 2 Sheets—Sheet 1.

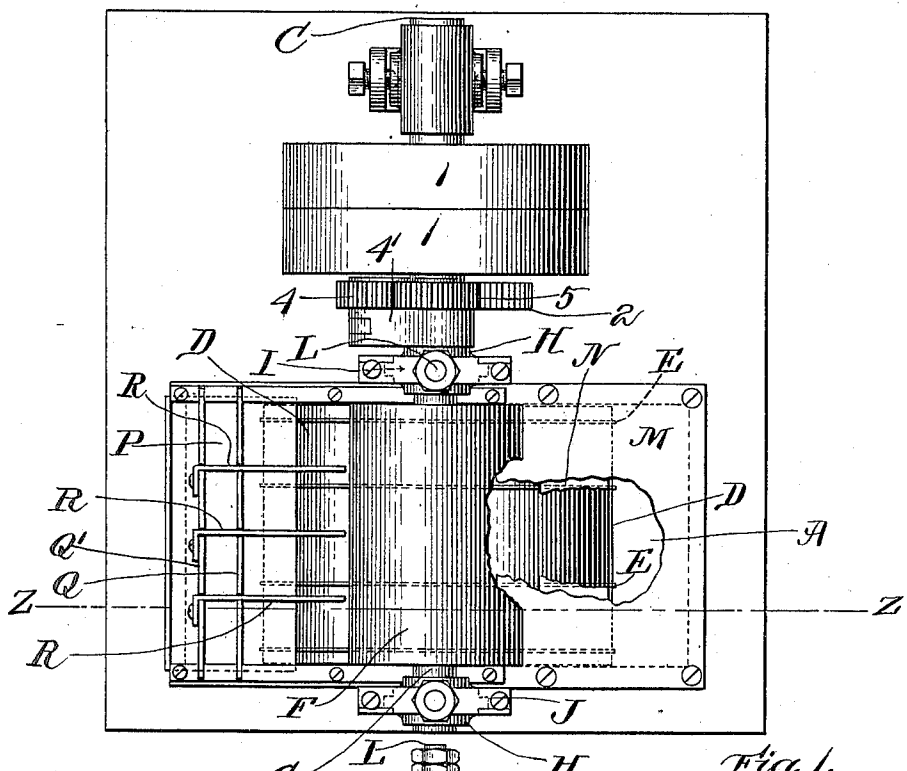


Fig. 1.

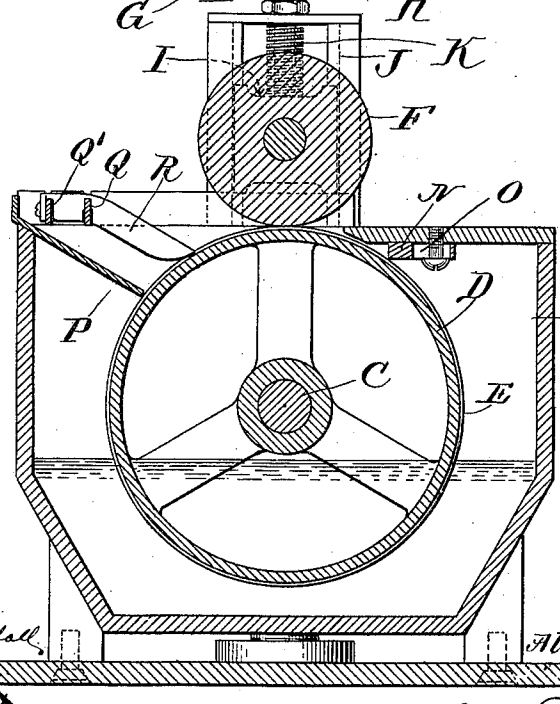


Fig. 2.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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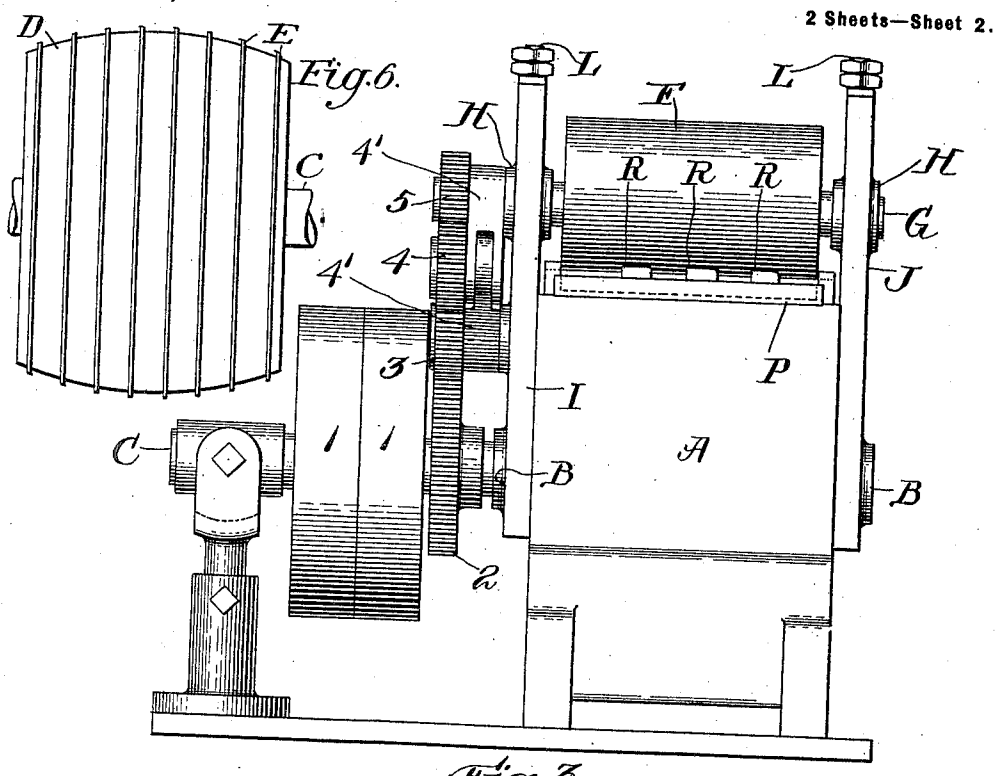


Fig. 3.

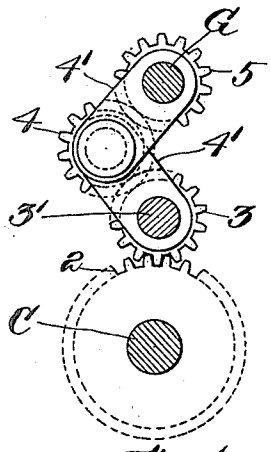


Fig. 4.

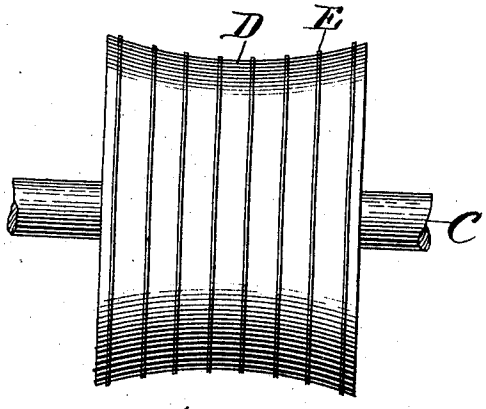


Fig. 5.

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UNITED STATES PATENT OFFICE.

ALBERT E. JOHNSON, OF BROCKTON, MASSACHUSETTS.

MACHINE FOR SPREADING LIQUID CEMENT.

SPECIFICATION forming part of Letters Patent No. 675,007, dated May 28, 1901.

Application filed November 12, 1900. Serial No. 36,175. (No model.)

To all whom it may concern:

Be it known that I, ALBERT E. JOHNSON, a citizen of the United States, residing at Brockton, in the county of Plymouth and State of Massachusetts, have invented a new and useful Improvement in Machines for Spreading Liquid Cement or other Liquids, of which the following is a specification, having reference to the accompanying drawings, in which—

Figure 1 is a plan view of a machine embodying my improvement. Fig. 2 is a sectional end elevation of the machine shown in Fig. 1, the section being on the line Z Z of Fig. 1. Fig. 3 is a side elevation of the machine shown in Fig. 1. Fig. 4 is an end elevation showing in detail a part of the driving mechanism, and Fig. 5 is an elevation of a part of a modification. Fig. 6 is an elevation showing another modification.

My invention relates more particularly to machines intended to spread cement or other liquid over the surface of soles for shoes or the surfaces of other articles; and my objects are to provide a spreading-machine adapted to spread the cement or other liquid evenly, to spread it in any desired thickness with a minimum of waste, and to spread it rapidly without tearing or injuring the surface on which it is to be spread. This I accomplish by the means which I shall now describe, the machine described being especially adapted for spreading rubber-cement upon soles for shoes. This particular machine is selected merely as a convenient means of describing my invention, which is applicable to machines for spreading other liquids and for spreading on other articles.

Referring to the drawings, on opposite sides of a vat or tank A, adapted to hold the liquid to be spread, which for convenience I have supposed to be rubber-cement, are bearings B, in which is journaled a shaft C, having mounted upon it a drum D, partly immersed in the cement contained in the vat. The surface of this drum, the function of which is to raise cement from the tank and spread it upon the article to be cemented, may be roughened, if desired; but I prefer to make it smooth, no channeling or grooving of the cement-carrying surface being necessary in machines built according to my invention. Projecting above the surface of the drum are a few narrow circumferential ridges E. The presence of these ridges and the determination of their proper height above the cement-carrying surface constitute important features of this part of my invention. The tops of these ridges stand at a uniform slight elevation above the main surface of the drum, that elevation depending upon the viscosity of the fluid to be spread and the thickness of the layer of the fluid desired to be deposited, as will be explained later in this specification. In the machine represented in Fig. 1 this drum is made of cast-iron and has ridges about one thirty-second of an inch high above the cement-carrying surface, that being a height which I have found suitable for spreading rubber-cement on leather soles for shoes. The drum may be made of other suitable material; but I prefer cast-iron as being durable and inexpensive.

Above the drum D is a pressure-roll F, which has a smooth cylindrical surface adapted to bear upon the tops of the ridges E and is mounted upon a shaft G, journaled in bearings H. These bearings are carried in plates I, that are adapted to slide in ways J, and so to allow the pressure-roll F to move away from the drum D when a sole or other article to be coated with cement is inserted between the drum and the roll. The roll F is normally pressed toward the drum D by springs K, mounted on rods L, parallel with the ways and adapted to slide through the top bar of the frame of the ways, thereby allowing the springs K to be compressed as the roll F rises. Any suitable driving mechanism may be used. That shown in the drawings consists of tight and loose pulleys 1, mounted on the main shaft C, and a train of gears 2 3 4 5 to transmit rotary motion from the shaft C to the parallel shaft G, the number of teeth being proportioned to make the pressure-roll F run properly in contact with the tops of the ridges E on the drum D. To allow for the up-and-down motion of the shaft G, caused by the rising and falling of the pressure-roll as different thicknesses of stock pass under it, the gear 4 is mounted on a stud carried at the joint of two links 4′, the other ends of which are journaled, one on the shaft G of the pressure-roll, to which shaft the gear 5 is fast, and the other on the fixed stud 3′ of the gear 3. The train of gearing is so designed that

adjacent surfaces of the pressure-roll and the drum D will travel in the same direction. It will now be understood that if a sole or other article on which it is desired to spread cement be inserted between the drum and pressure-roll it will be seized between the pressure-roll and the ridges of the drum and drawn through between them, the main surface of the drum lying close to the surface of the sole on which the cement is to be spread, but not in contact with it.

On the side of the drum from which the soles or other stock are fed is a cover M to the vat or tank A, which serves as a feeding-table to deliver stock between the rolls. On the under side of this cover is a stripper-plate N, fastened in any suitable manner. I prefer to fasten this by screws passing through slots O in the plate in such manner that the edge of the stripper-plate may be fastened with its edge at any desired distance near the surface of the drum. This plate serves to strip off from the drum any excess of cement which might otherwise be carried up by it and leaves the layer of cement uniform on the surface of the drum, except of course over the ridges. The cover M fits as close to the drum as is convenient in order to close as much as possible all openings through which air might enter or leave the tank, thereby retarding waste of the liquid by evaporation. A cover P on the delivery side of the rolls likewise fits close. Cross-bars Q Q′, running from side to side of the vat on the delivery side of and parallel with the drum, support thin ways R, which are adapted to receive the sole or other cemented article after it has passed between the rolls. These ways are fixed so that their points are close to the surface of the drum D, below the surface of its ridges, so that if thin stock were being cemented, which might have a tendency to cling to the drum after passing the rolls, it would be caught by the points of the ways R and stripped off the drum. The cross-bar Q is set in such a position with respect to the ways R that any threads of cement stringing or dribbling after the sole as it leaves the surface of the drum will fall across the bar, catch upon it, and thus be cut or trimmed off. The cement thus cut off runs down and falls upon the cover or apron P, which is an inclined plate supported by the grooves in the sides of the vat A and having its edge close to the drum, so as to cover the delivery side of the vat to prevent vapor from escaping. Cement which falls upon this apron runs down toward the drum and is there caught by the revolving drum and drawn down around the edge of the apron into the vat below. I prefer to make the drum D with spokes, and these agitate the fluid in the vat as the drum revolves, thus mixing the return drippings with the other cement and keeping the composition of the whole uniform. As a further guard against evaporation or leakage, the joints where the shaft C pierces the sides of the vat are packed in some suitable manner.

The operation of my machine is simple. The workman thrusts one end of a sole between the rolls D and F. The rolls grip it and pull it through, and the workman removes it from the ways R completely spread with cement. In its passage through the machine the surface that is to be spread bears against the ridges E and against the body of liquid on the drum, but is supported by the ridges, so that it does not come in contact with the surface of the drum itself. The drum and roll may therefore rotate at a high speed, enabling one workman to cement a large number of soles per hour. If stock of varying thickness is to be cemented—as, for example, soles to which slip-taps have been fastened—the springs K automatically adjust the machine to the thickness of the stock as it passes through and keep the surface that is to receive cement bearing upon the tops of the ridges.

In designing a drum for my machine regard should be had to the stiffness or flexibility of the article to be cemented. If that article is stiff enough not to sag between the ridges, so as to touch the surface of the drum—such as, for example, a board of wood—the ridges may well be only two in number, located near the opposite ends of the drum, the board being wide enough to reach from one ridge to the other. It is not necessary or desirable for the surface that is to be cemented to come into contact with the main surface of the drum. If the article is flexible or has a tendency to sag, the ridges should be nearer together, as in the form shown in Fig. 1, which form is also adapted to be used when articles of varying width are to be cemented. The continuous circumferential ridges serve somewhat to assist the tensile force of the liquid to cling to the drum by furnishing greater clinging surface; but principally they serve to keep at a proper distance from the main surface of the drum the surface of the stock that is to be cemented, so that the layer of cement on the drum may be transferred to the surface of the stock in a continuous sheet. The cement is then laid smooth on every part of the stock, spreading itself over the narrow strips on the stock that were in contact with the ridges without requiring any auxiliary spreading device to make the layer continuous and even. By substituting a drum D with higher or lower ridges I am able to make the layer of cement which the machine spreads of greater or less depth, being limited in this respect only by the degree of viscosity of the liquid. The ridges should be high enough above the main surface of the drum and near enough together to keep the stock away from that surface and yet to keep it in contact with the film of cement carried thereon, with a sufficient body of the cement between it and that surface to deposit a layer of the desired thickness on the stock.

In spreading cement on the bottom of shoes I dispense with the pressure-roll F and use a drum shaped to fit the bottoms which are to be cemented, and the shape given to the drum in this case, it is obvious, may be either a convex or a concave shape, as may be found desirable for the special work in hand. In either case the ridges have to be somewhat nearer together, because of the curved shape. To operate the machine as thus modified, the workman holds the shoe in his hands and passes it over the wet top of the drum in the direction the drum rotates, pressing down as much as is necessary with his hand and keeping the bottom pressed against the ridges. This modification of my device is shown in Figs. 5 and 6.

The essential feature of my device is the presence of ridges adapted to separate the article to which the cement is to be applied from contact with the main surface of the drum, so that it is simply bathed in the liquid, and the height of the ridges depending on the thickness of the layer desired to be deposited within the limits of viscosity of the liquid or the thickness of the body of liquid that will cling by its own tensile strength to the main surface of the drum and be carried by it up from the tank. As the main surface of the drum does not come into contact with the stock, no channeling or cross-grooving or other roughness on that surface will scar or injure the stock, nor will any stock that may have been smoothed preparatory to making a tight joint be torn or broken by being passed through the machine, no matter how rapidly the rolls may revolve. Other advantages of my machine are that it can be adjusted accurately, so as to deposit the least sufficient amount of cement; that it wastes no cement by spreading it over the edges of the sole, and that it saves the trailings. A marked saving over other methods hitherto known to me results when rubber-cement is being spread, from the fact that the liquid-supply is almost completely protected from the air and can evaporate but slowly. The rapidity with which the machine may operate saves considerable expense for labor.

I claim—

1. In a machine for spreading liquids, a tank adapted to hold the liquid to be spread; a rotatably-mounted drum set within the tank and adapted to spread the liquid; a trimmer-bar fixed to the delivery side of the drum and adapted to trim the trailings from articles delivered from the drum; and a cover for the tank adapted to fit close to the drum and having a surface situated under the trimmer-bar and inclined downward toward the surface of the drum, whereby the trimmings are delivered upon the downward-rotating surface of the drum.

2. In a machine for spreading liquids, a rotatably-mounted drum having a convex surface; circumferential ridges at or near the edges of the convex surface of the drum; and a frame to support the drum; the ridges being adapted to bear against the surface that is to be spread and to maintain that surface in contact with the liquid on the main surface of the drum, but out of contact with that main surface.

3. In a machine for spreading liquids, a rotatably-mounted drum having a convex surface; two or more circumferential ridges upon the convex surface of the drum; those ridges being narrow as compared with the zones of said convex surface between the ridges, and being adapted to bear against the surface upon which the liquid is to be spread, to permit that surface to come near but not into contact with those zones; and a frame to support the drum.

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