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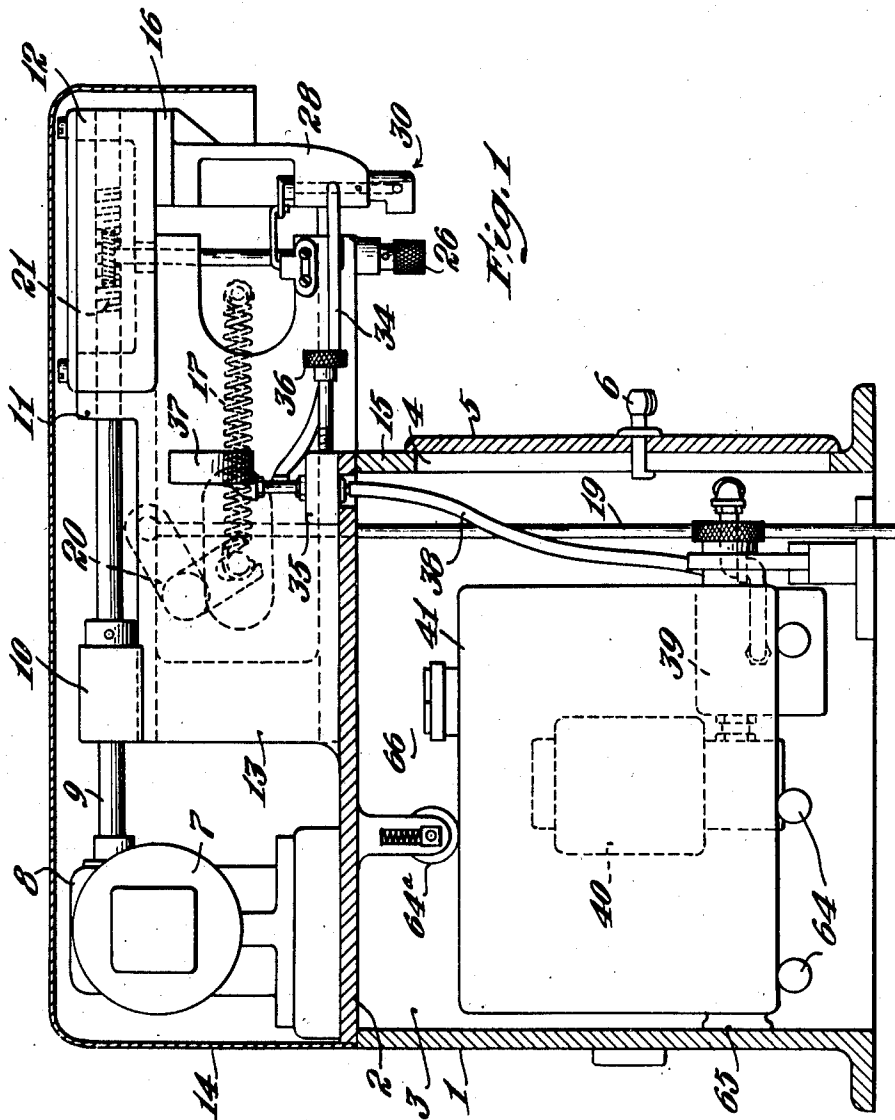
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2,467,384

APPARATUS FOR APPLYING ADHESIVE

Filed June 17, 1944

15 Sheets-Sheet 1



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15 Sheets-Sheet 2

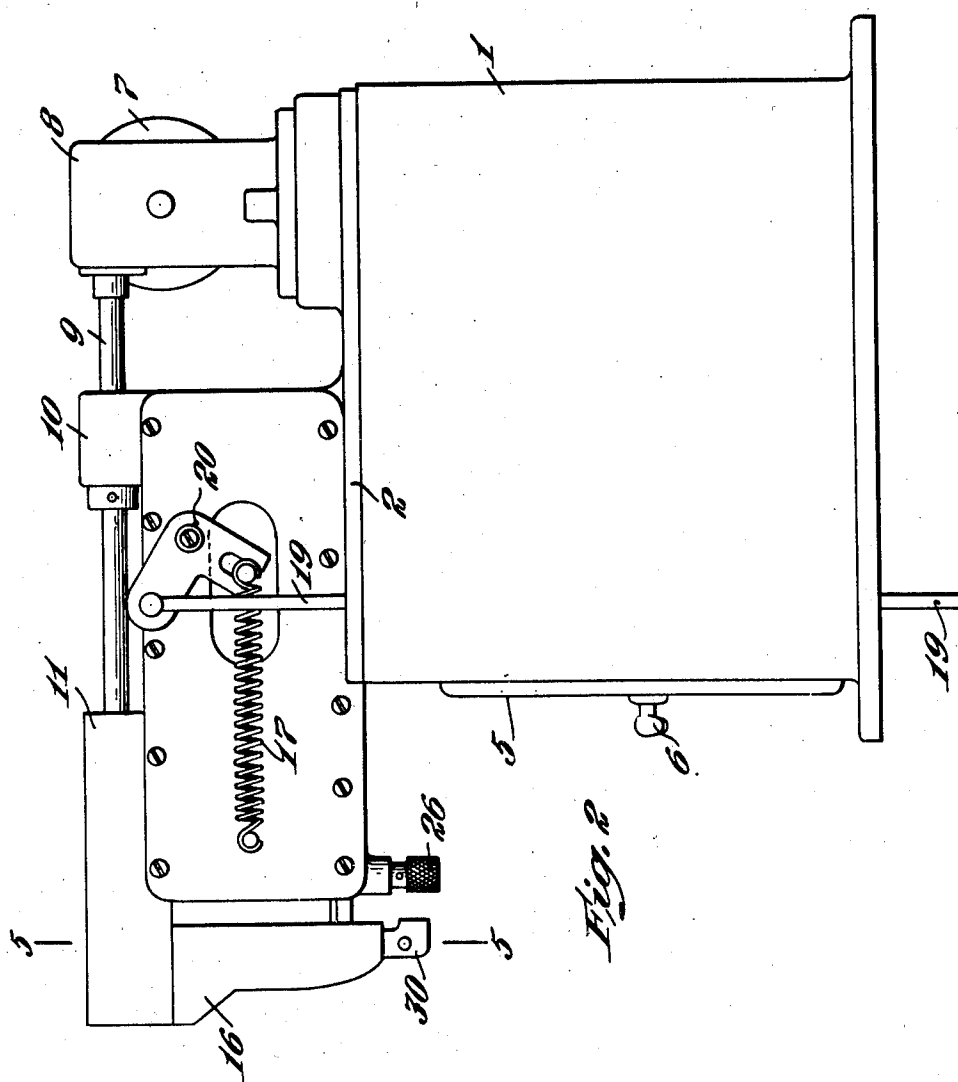


Fig. 2

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15 Sheets-Sheet 3

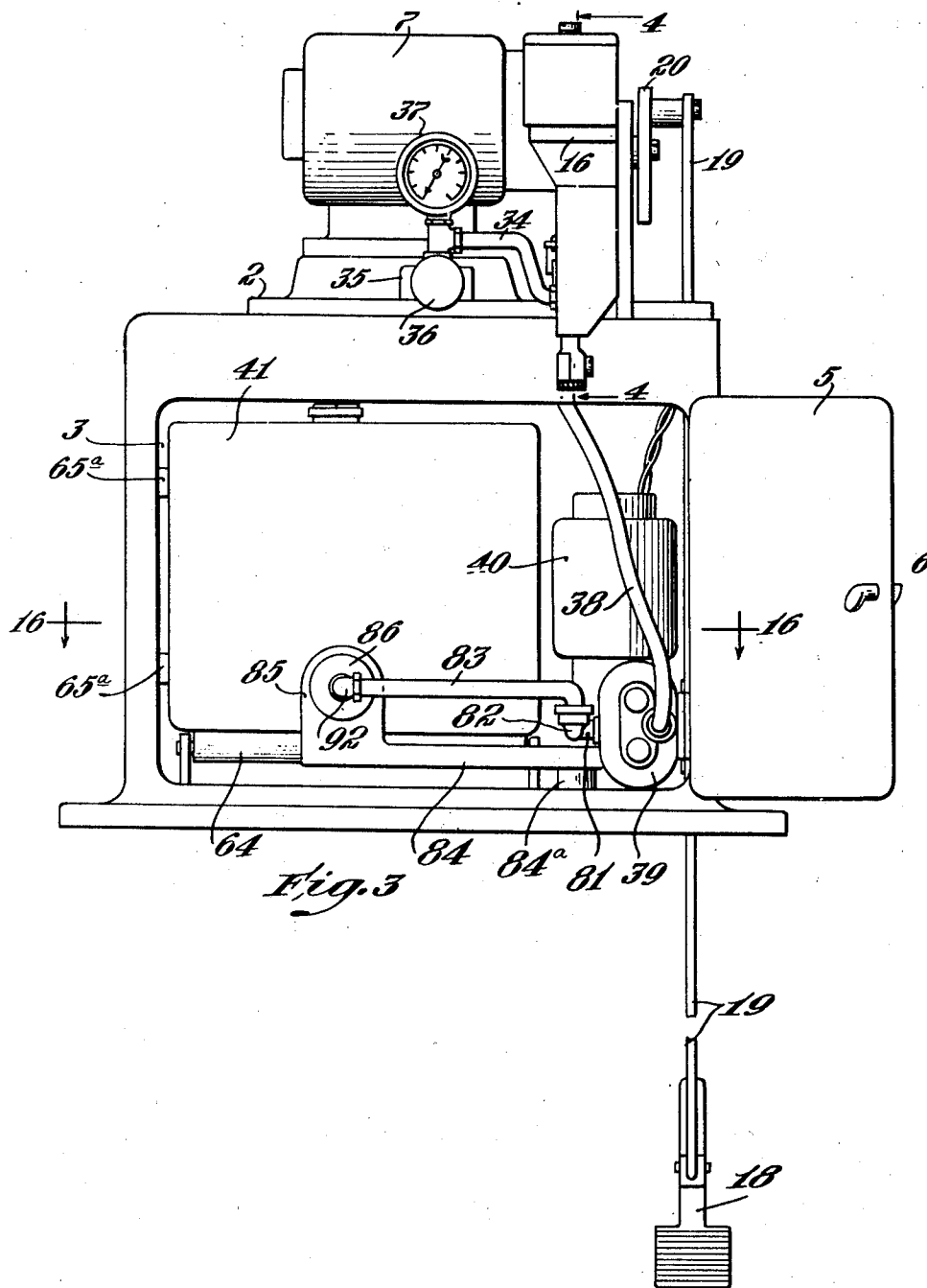


Fig. 3

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Fig. 4

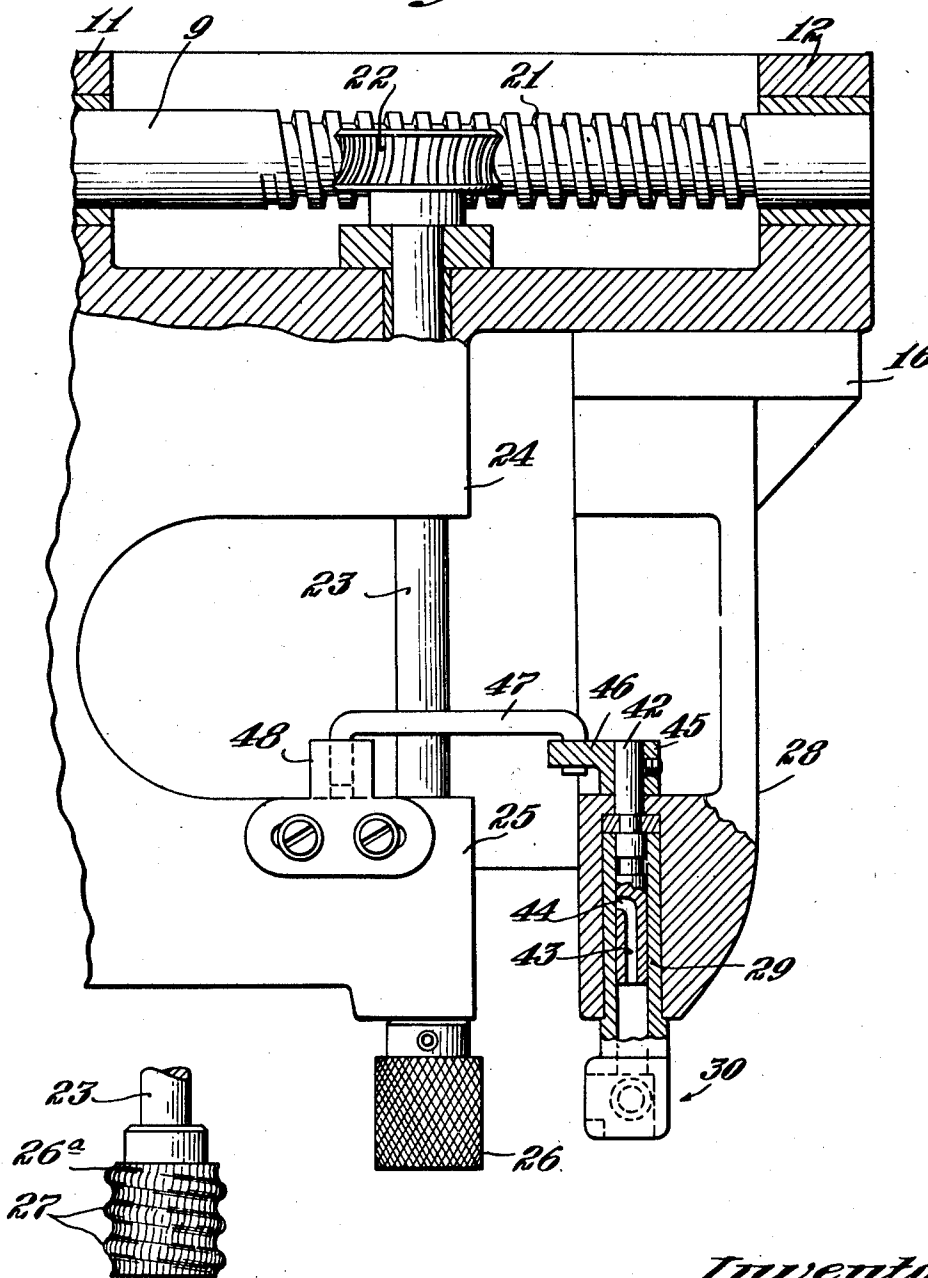


Fig. 4²

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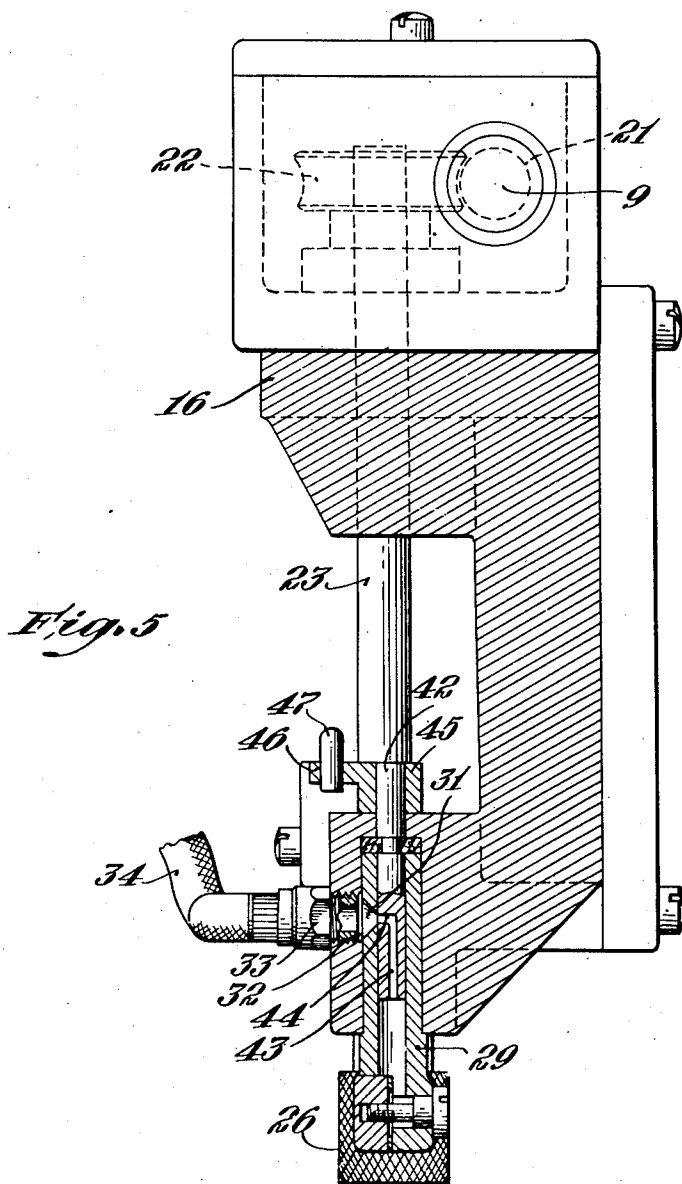
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APPARATUS FOR APPLYING ADHESIVE

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15 Sheets-Sheet 5



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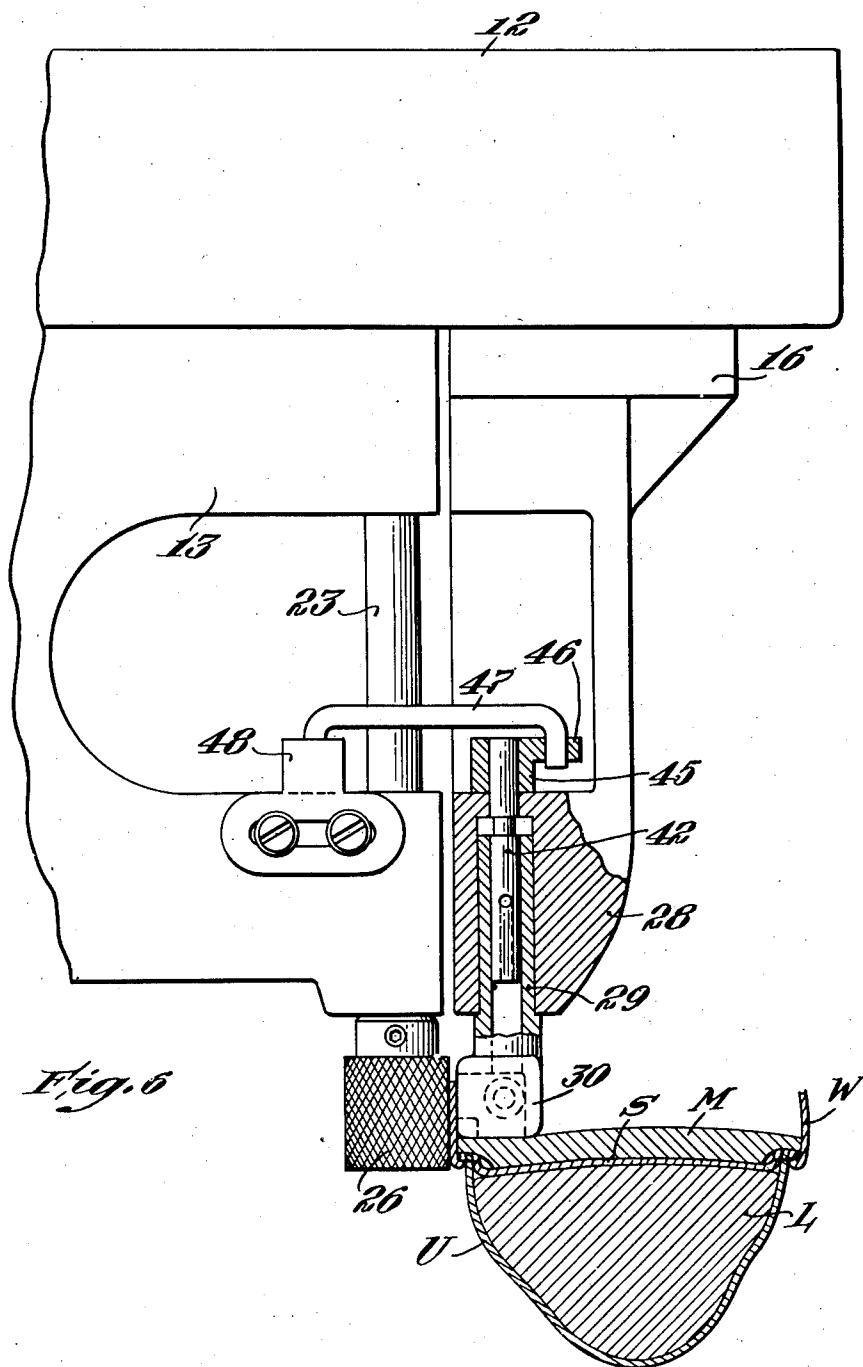
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15 Sheets-Sheet 6



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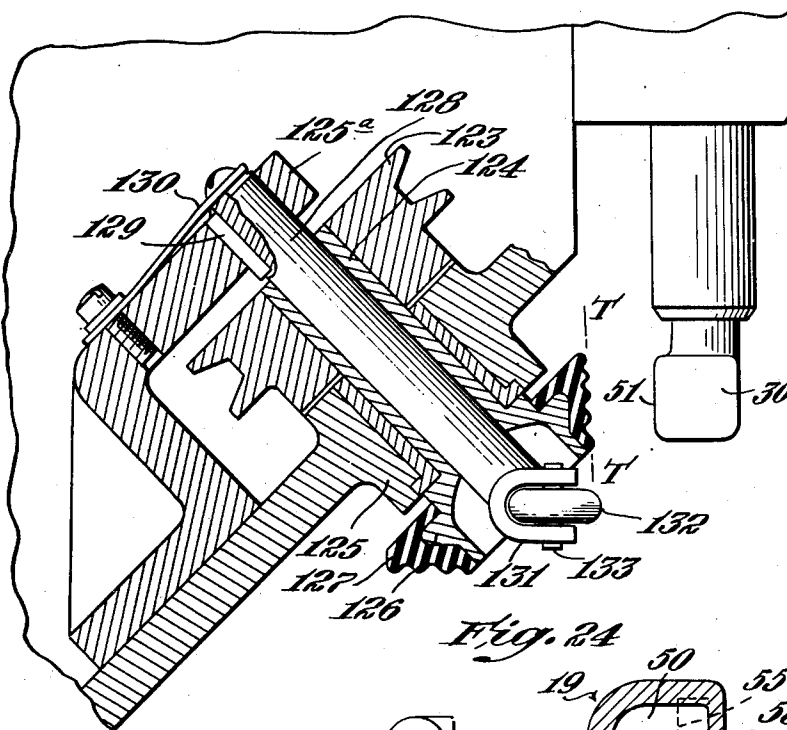


Fig. 24

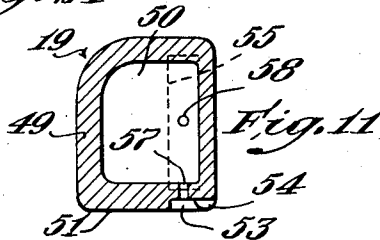


Fig. 11



Fig. 9

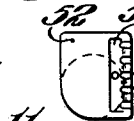


Fig. 10

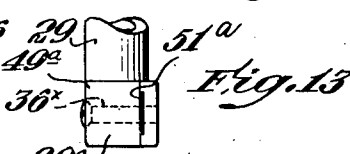


Fig. 13

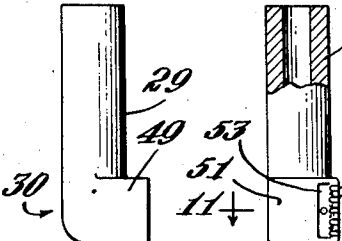


Fig. 7



Fig. 8

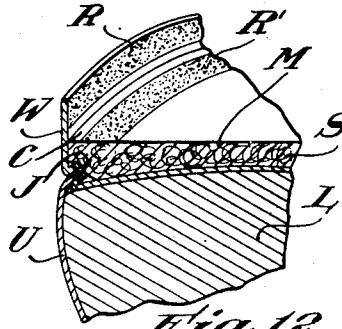


Fig. 12

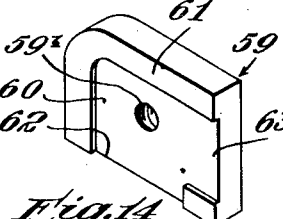


Fig. 14

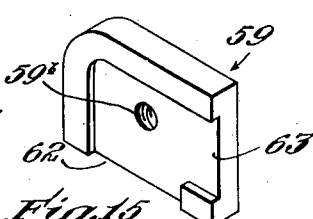


Fig. 15

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Fig. 17

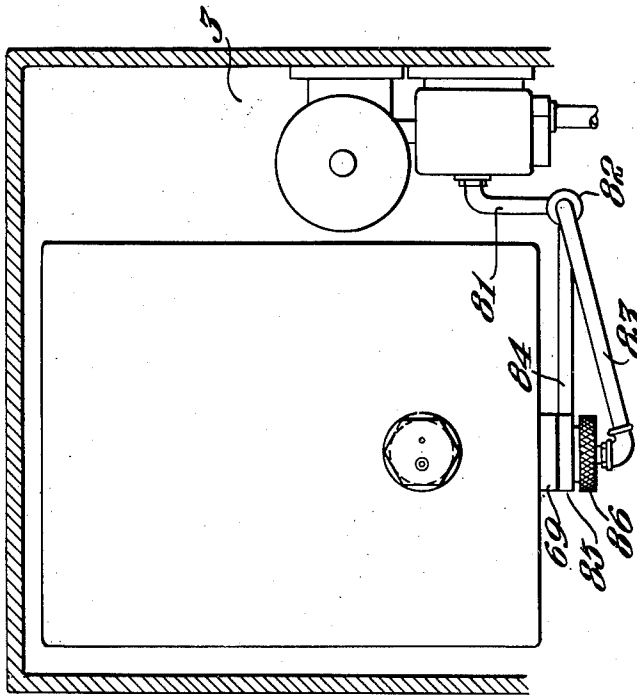
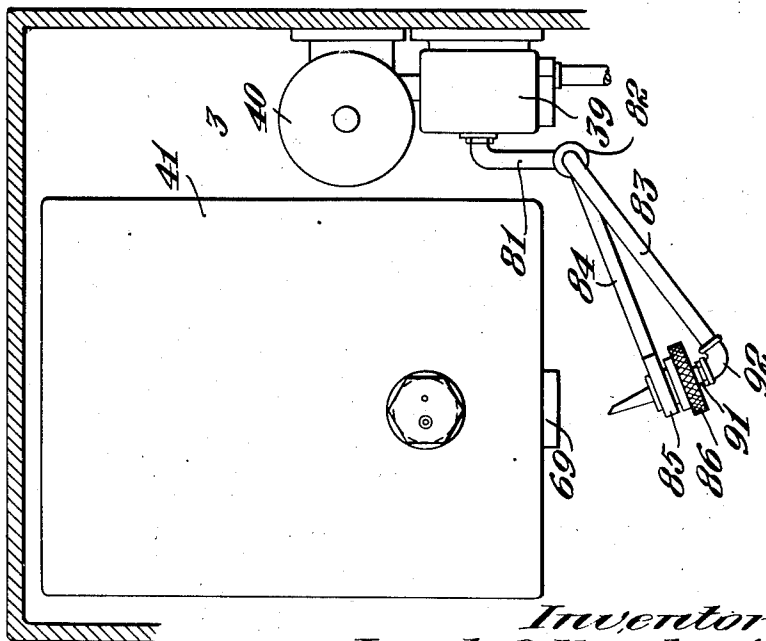


Fig. 16



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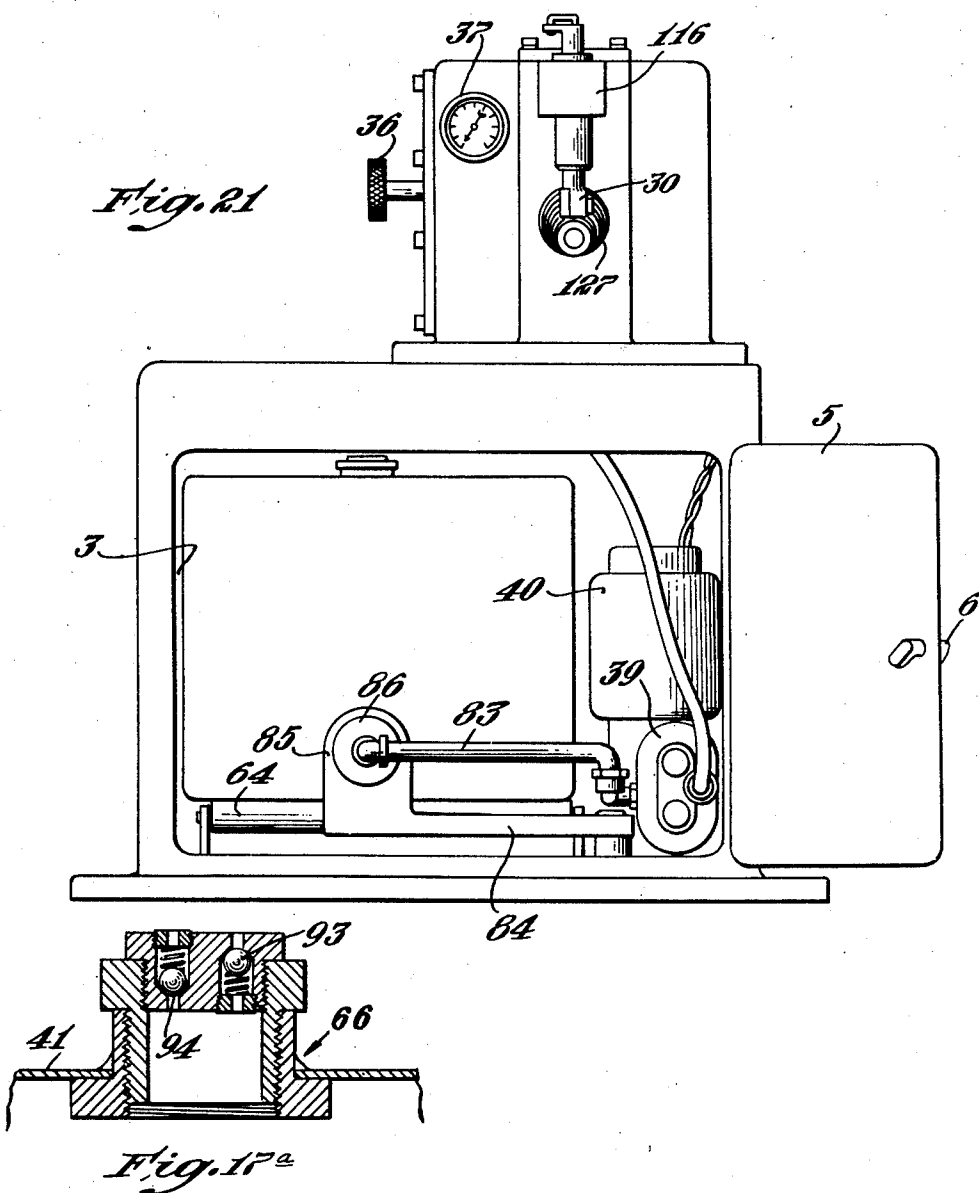
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15 Sheets-Sheet 9



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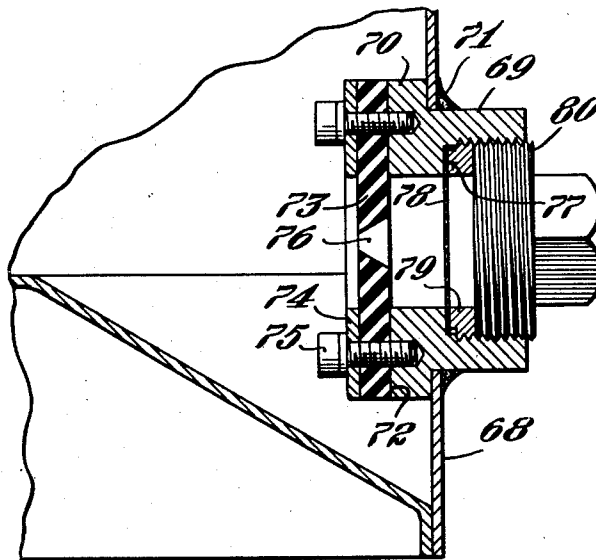


Fig. 18

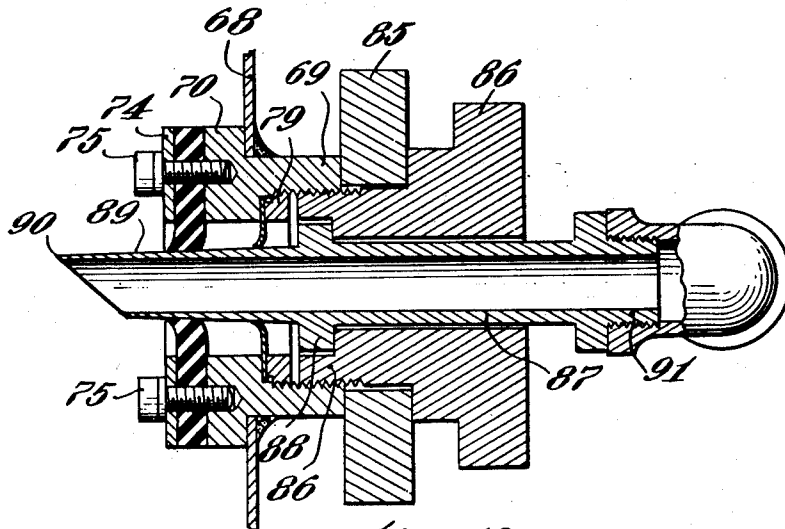


Fig. 19

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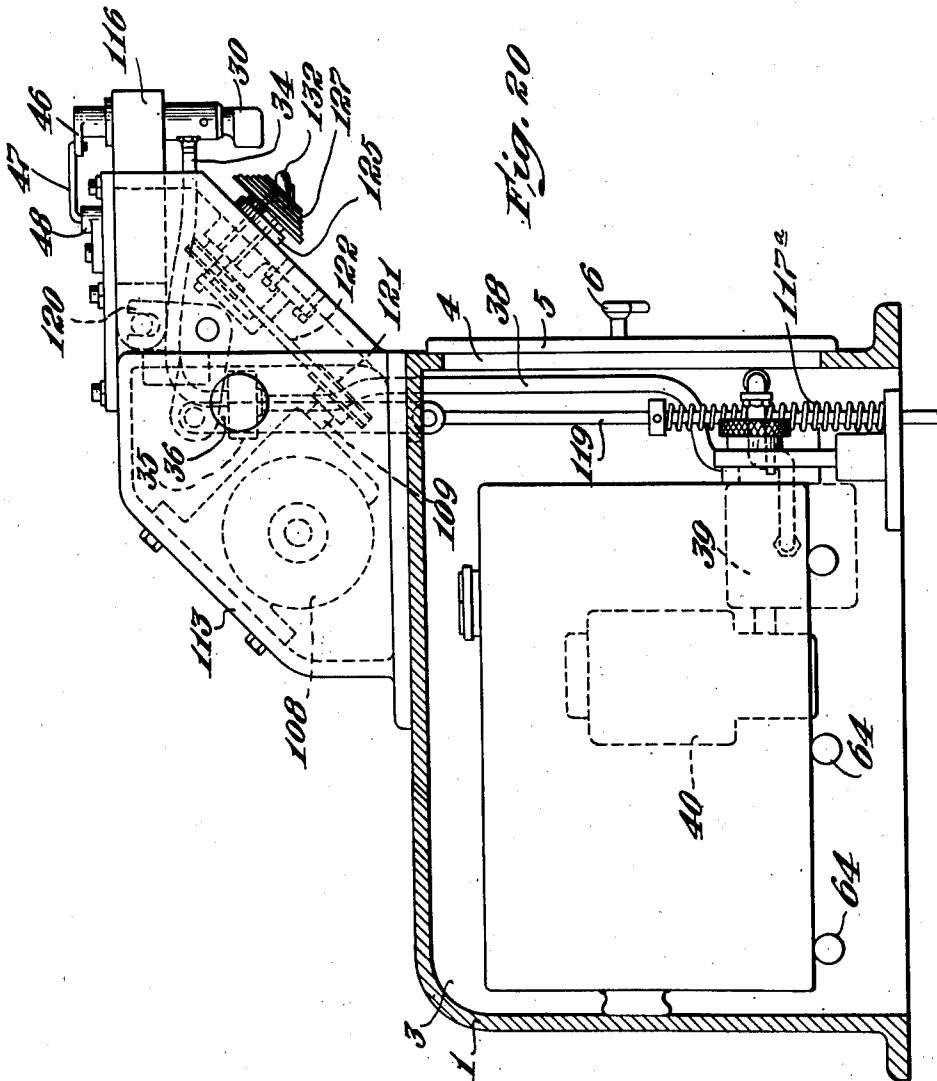
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15 Sheets-Sheet 11



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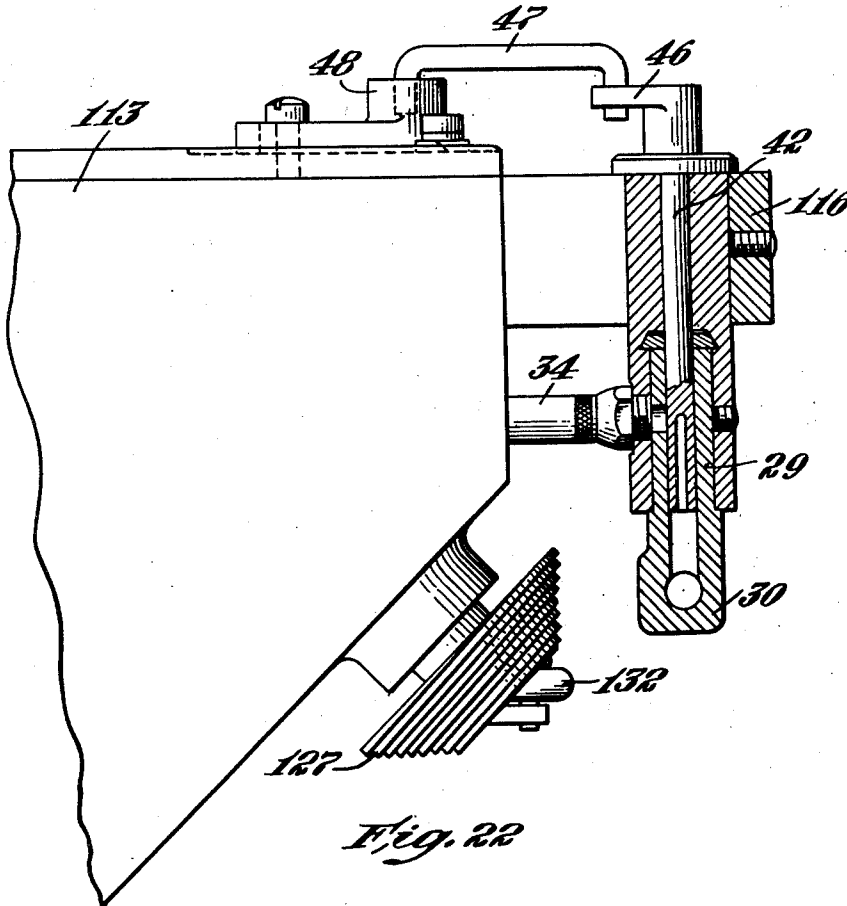
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15 Sheets-Sheet 12



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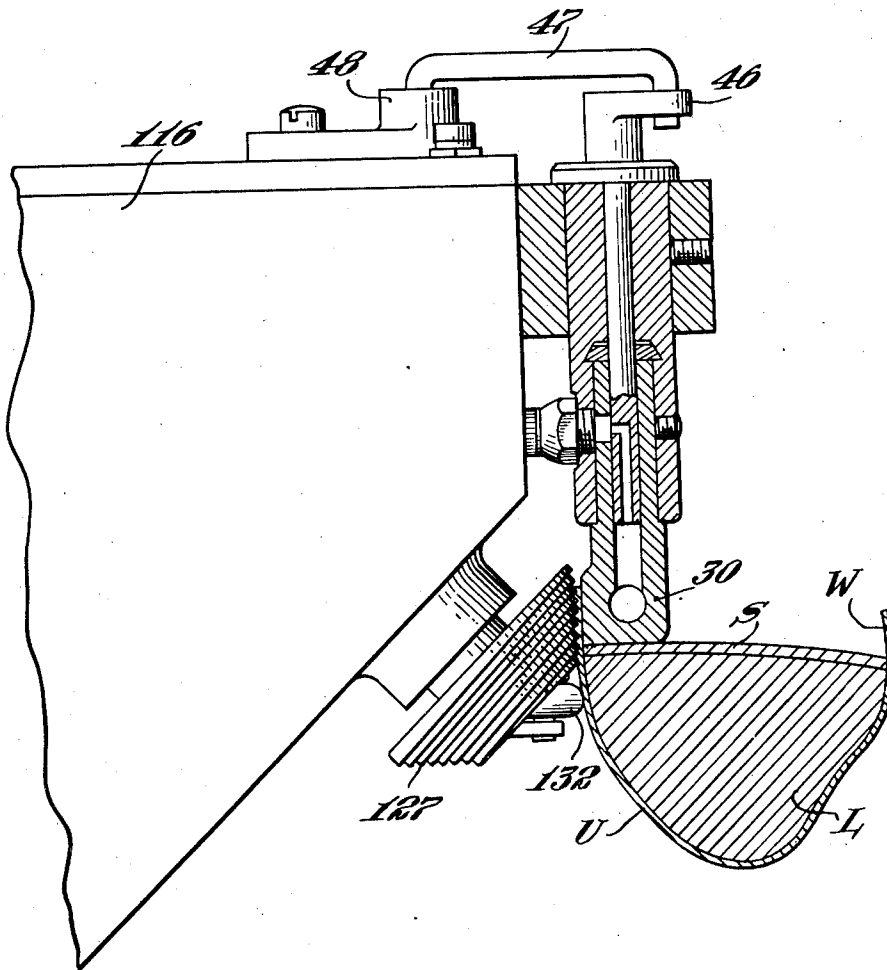
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Fig. 23



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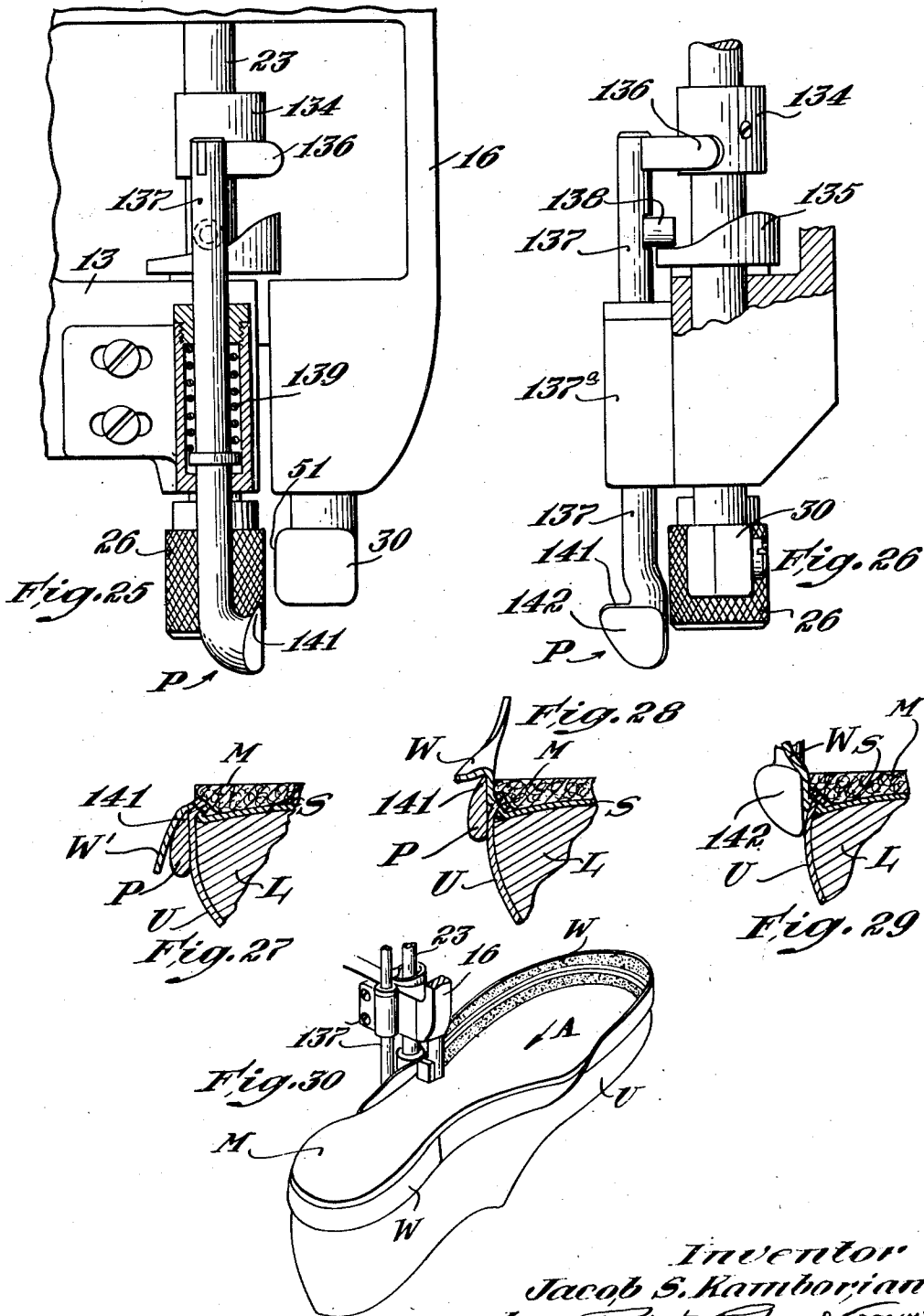
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15 Sheets-Sheet 14



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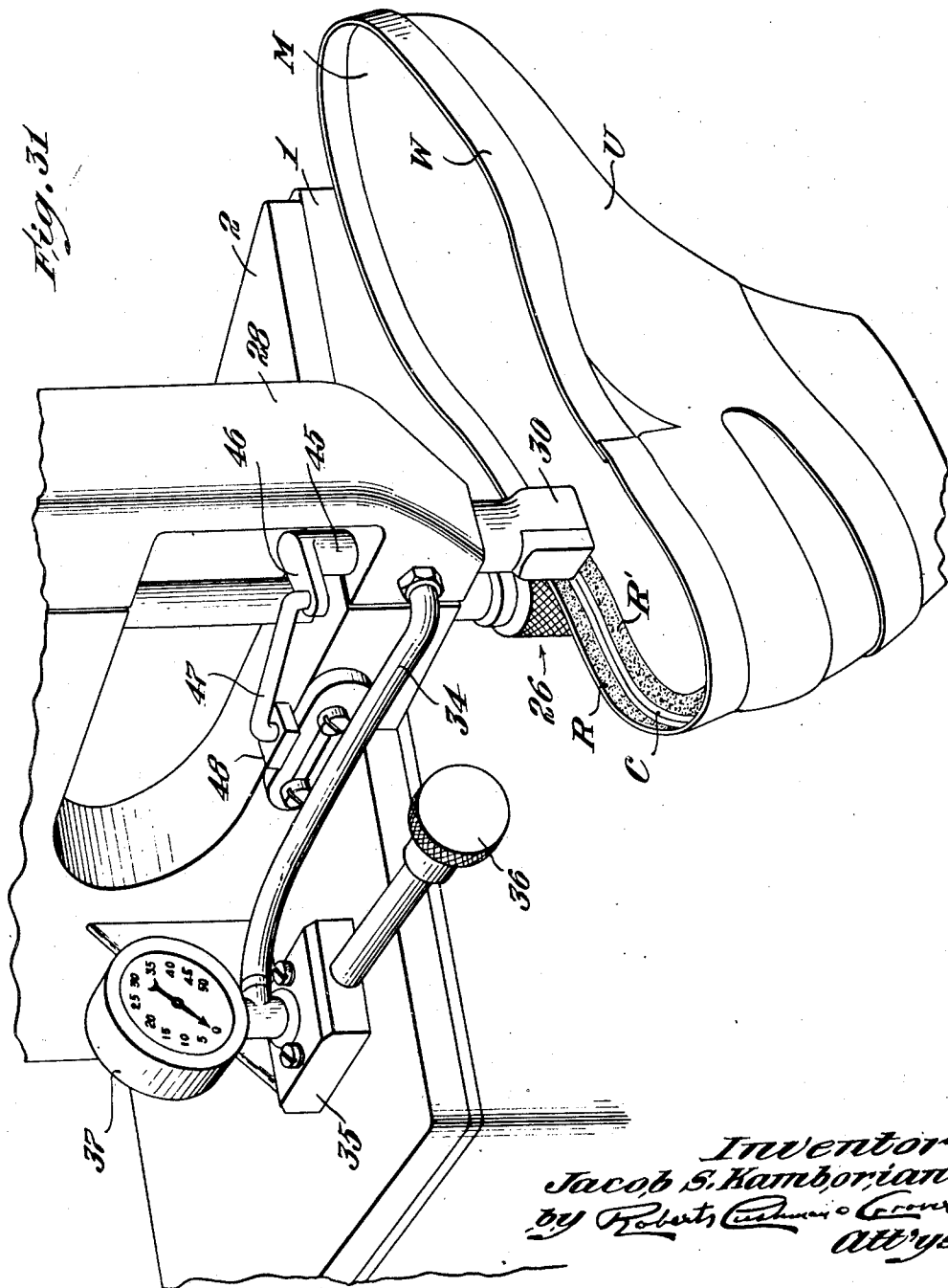
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UNITED STATES PATENT OFFICE

2,467,384

APPARATUS FOR APPLYING ADHESIVE

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Application June 17, 1944, Serial No. 540,868

16 Claims. (Cl. 12—1)

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This invention relates to apparatus for applying fluid adhesive, and more particularly to apparatus designed to apply adhesive simultaneously to two adjacent surfaces, usually disposed in intersecting planes, in such a way as to leave the surfaces immediately bordering the junction between them free from adhesive. While the invention is of broad utility and the apparatus herein disclosed is useful for applying adhesive simultaneously to adjacent surfaces of various articles, for instance to parts of cardboard boxes or the like, it is specifically illustrated herein, by way of example, as employed in the manufacture of shoes, in particular for applying adhesive simultaneously to the inner surface of a marginal portion or appendage of the shoe upper and to the margin of a sole member assembled with the upper upon a last. For more particular illustration, the shoe is herein shown as of the force-lasted or California type.

Herein, in referring to the manufacture of shoes and to the application of adhesive to the shoe parts, the term "shoe upper" is employed broadly and intended to cover the upper, proper, of a shoe of ordinary type, whether such upper comprise one or more plies of material, and also to include such an appendage to the upper, whether integral or not, as the "wrapper" or "platform cover" of a California type or force-lasted shoe. Likewise when reference is made to a "sole" or "sole member," this term is intended in a broad sense and to include such elements as the insole, proper, of a shoe of ordinary type whether welt, McKay, or cement lasted; the middle sole of either an ordinary type or a California type of shoe, and the cushion sole or sock lining of the latter type of shoe. While these particular instances of the meaning of "upper" and "sole member" have been given by way of illustration, it is not intended thereby to limit the interpretation of the terms "upper" and "sole member" to these particular embodiments.

Whenever it is attempted to apply adhesive to the inner surface of the margin of an upper and to the margin of a sole member assembled with the upper upon a last, the adhesive, whether applied as a spray or by means of a brush, tends to enter the extreme angle between the upper and sole member and to flow down around the peripheral edge of the sole member so that as it sets it firmly unites the upper and sole member in the position which they at that time occupy. When, thereafter, it is attempted to last the shoe, if of ordinary type, or to stress the wrapper of a force-lasted shoe preparatory to laying it down on the sole member, the adhesive union of the parts strongly resists stress applied to the upper or wrapper so that it is substantially impossible to draw the upper snugly down to the wood of the last or to provide the neat fit and

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sharp corner desirable where the wrapper of the force-lasted shoe bends about the edge of the middle sole, even though force sufficient to tear the upper material be applied.

Moreover, the customary modes of applying the adhesive are slow and very wasteful of the adhesive, also adding very considerably to the cost of making shoes.

One object of the present invention is to provide means for applying cement simultaneously to two adjacent surfaces, for example, two surfaces located in intersecting planes as for instance the upper of an ordinary cement lasted shoe (assembled on a last with an insole) and the exposed surface of the insole, or as a further example, the inner surface of the wrapper of a force lasted shoe and the margin of the cushion or middle sole of such a shoe, and to provide means operative so to apply the adhesive in a more expeditious, less wasteful and less expensive way than heretofore. A further object is to provide means for so applying adhesive to adjacent surfaces as to avoid prematurely attaching adjacent parts to each other. A further object is to provide cement-applying means operative to apply cement in distinct, spaced ribbons to the two surfaces and adjacent to the line of intersection of the respective planes of said surfaces, but spaced from said line of intersection. A further object is to provide means for stressing one of the parts transversely of the line of intersection while applying the adhesive, thereby to insure application of the adhesive to the proper portion of said part. A further object is to provide adhesive-applying apparatus so designed that the thickness and width of the ribbons of applied adhesive may be varied at will.

A further object is to provide novel means for guiding and advancing the shoe while the adhesive is being applied. A further object of the invention is to provide apparatus of the class described having a container or reservoir for adhesive so devised as to protect the adhesive from contamination by dirt or other solids, to shield it from the open air thereby to avoid evaporation loss, and so devised as to avoid such waste as commonly occurs during the transfer of the adhesive from the shipping container to the storage tank of the applying machine. A further object is to provide a novel form of combined shipping and storing container for the adhesive whereby the supply of adhesive may readily and quickly be replenished without waste or exposure of the adhesive to the air, and without requiring substantial delay in the operation of the machine.

Other and further objects and advantages of the invention will be pointed out in the following more detailed description and by reference to the accompanying drawings wherein

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Fig. 1 is an elevation of the left-hand side of the machine, partly in vertical section, and with certain parts broken away;

Fig. 2 is an elevation of the right-hand side of the machine omitting certain parts and with certain parts broken away;

Fig. 3 is a front elevation (certain parts being broken away) of the machine of Fig. 1 with the door of the base open to show the parts within the base;

Fig. 4 is a fragmentary vertical section to larger scale, substantially on the line 4—4 of Fig. 3, showing the adhesive-applying element in its inoperative position;

Fig. 4^a is a fragmentary side elevation illustrating a modified form of feed roll.

Fig. 5 is a fragmentary vertical section substantially on the line 5—5 of Fig. 2 but to larger scale;

Fig. 6 is a fragmentary elevation, partly in vertical section, showing the left-hand side of the machine to large scale and illustrating the operation of applying adhesive to a force-lasted shoe;

Fig. 7 is a side elevation of one desirable form of cement-applying nozzle;

Fig. 8 is a rear view, partly in section, of the nozzle device of Fig. 7;

Fig. 9 is a plan view of the nozzle of Fig. 7;

Fig. 10 is a bottom plan view of the nozzle of Fig. 7;

Fig. 11 is a section to large scale on the line 11—11 of Fig. 8;

Fig. 12 is a fragmentary perspective view of a partly completed shoe showing the location of the ribbons of cement applied to the shoe parts by the mechanism of this invention;

Fig. 13 is a fragmentary rear elevation of an alternative form of cement-applying nozzle;

Figs. 14 and 15 are perspective views to larger scale than Fig. 13, illustrating interchangeable parts of the nozzle of Fig. 13, the nozzle with certain of its parts removed;

Fig. 16 is a diagrammatic plan view illustrating the dispensing container for the adhesive and the means for connecting the container to the supply pump but before the connection has been made.

Fig. 17 is a view similar to Fig. 16, showing the parts in the position which they occupy when the container has actually been connected to the pump;

Fig. 17^a is a section to large scale illustrating a safety valve device mounted on the container;

Fig. 18 is a fragmentary section through the wall of the combined shipping and dispensing container illustrating the special construction whereby the container may be secured to the supply pump without admitting air or waste of adhesive;

Fig. 19 is a section similar to that of Fig. 18 showing the container connected to the suction pipe of the pump;

Fig. 20 is a side elevation, partly in vertical section, illustrating a modified form of apparatus;

Fig. 21 is a front elevation of the apparatus of Fig. 20 with the door in the base open to show the interior;

Fig. 22 is a fragmentary elevation of the left-hand side of the machine, to large scale, showing the parts in the inoperative position;

Fig. 23 is a view similar to Fig. 22 but showing the parts in the operative position of applying cement to a shoe;

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Fig. 24 is a vertical section to large scale, showing details of the work guiding and feeding means;

Fig. 25 is a fragmentary elevation, partly in vertical section, of the right-hand side of the front portion of the machine showing a wrapper-turning plow which is useful in the operation of cementing force-lasted shoes;

Fig. 26 is a fragmentary front elevation of the parts shown in Fig. 25;

Fig. 27 is a fragmentary transverse, diagrammatic section through a last with a shoe upper and sole member mounted thereon, the upper including a wrapper shown in its initial position;

Fig. 28 is a view similar to Fig. 27, but showing one stage in the operation of the wrapper-turning plow;

Fig. 29 is a similar view showing the final stage in the operation of the wrapper-turning plow;

Fig. 30 is a diagrammatic perspective view illustrating the relative positions of the cement-applying, work-feeding and wrapper-turning devices; and

Fig. 31 is a fragmentary perspective view illustrating the mode of operation of the machine.

Referring to the drawings the numeral 1 designates a hollow base or column having a top member 2 which may or may not be integral with the vertical side walls of the base, the base constituting a protective case for certain operative parts and having within it a chamber 3, preferably having a door aperture at 4 normally closed by a hinged door 5 having a locking handle 6. On the rear portion of the top member 2 (Fig. 1) there is mounted an electric motor 7 having associated therewith a speed reduction mechanism 8 having a power delivery shaft 9. This shaft is journaled in bearings at 10, 11 and 12 carried by the rigid frame 13, the latter being supported by the top member 2 of the base and being integral with said top member if so desired. This frame 13 projects forwardly beyond the vertical front face 15 of the base 1 so as to space the operating mechanism forwardly away from the base and thus avoid interference between the work and the base. The frame 13 is provided with horizontal guideways for a slide member 16 designed to move from front to rear and which is constantly urged toward the rear by the spring 17 (Figs. 1 and 2). However, this slide 16 may be moved forwardly, in opposition to the spring 17, by means of a treadle 18 (Fig. 3) conveniently located for actuation by the operator's foot and which operates a rod 19 pivotally connected to one arm of a bell-crank lever 20, pivotally mounted on the frame 13, the opposite arm of the bell-crank lever being connected to the slide 16.

The drive shaft 9 is provided with a worm 21 (Figs. 1 and 4) at a point between the bearings 11 and 12, and this worm meshes with a worm wheel 22 fixed to the upper end of a vertical shaft 23 mounted in spaced bearings 24 and 25 carried by or forming a part of the machine frame. The shaft 23 projects downwardly below the lower bearing 25 and has fixed thereto a work-advancing roll 26. As shown in Fig. 4 this roll has a cylindrical, knurled peripheral surface, such a roll exerting a feeding or advancing action upon the work. Instead of the cylindrical knurled roll 26 a roll such as the roll 26^a of Fig. 4^a may be used, the roll 26^a having a helical peripheral rib or ribs 27 in this respect being generally similar to the rear roll of the lasting machine disclosed in the patent to Kamborian No. 2,251,-

284, dated August 5, 1941, and having a combined advancing and updrawing action on the work.

The slide 16 is provided with a downwardly directed bracket arm 28 (Fig. 4) having a vertical bore designed to receive the tubular stem 29 of an applicator nozzle 30. The tubular stem 29 is provided in its side wall with an inwardly convergent opening 31 (Fig. 5) whose outer, larger end is normally registered with a transverse bore 32 in the rear wall of the bracket 28. This bore 32 is internally screw threaded for the reception of the threaded end of a hollow fitting 33 to which is connected the forward end of a flexible, fluid-supply conduit 34. This fluid supply conduit leads to a pressure regulating valve device 35 (Fig. 1) having a regulating handle 36 conveniently located for operation, and also preferably provided with a gauge 37 (Fig. 3) by means of which the operator may determine the pressure at which the adhesive is being delivered to the applicator nozzle. By turning the handle 36 the pressure may be regulated as desired. The fluid adhesive is supplied to the pressure regulator 35 by means of a pipe 38 leading from the delivery of a force pump 39 (Fig. 1) located (as shown in Fig. 3) in the lower right-hand part of the chamber 3 in the base, the pump being driven by a motor 40 arranged above the pump in the right-hand part of the chamber 3 and receiving the fluid adhesive from a dispensing container 41 arranged within the chamber. While this location of the supply of adhesive and the means for conducting it to the applicator nozzle is desirable and preferred, it is to be understood that the broad invention is not limited to this particular arrangement for supplying adhesive to the nozzle, and that, for example, by suitably locating the supply container, the adhesive may be caused to flow by gravity to the nozzle, thus avoiding the necessity for a power-driven pump. However, for compactness of arrangement and convenience of use it is preferred to employ a pump to provide the desired pressure of delivery.

Referring to Fig. 4, the tubular stem 29 of the applicator nozzle houses a rotary valve 42 having an axial bore 43 opening at its lower end into the lower part of the tubular stem 29 and having a lateral port 44 at its upper end which may, at times, be registered with the inner, smaller end of the opening 31 in the tubular stem 29 but which at other times is so located as to be closed leaktight by the inner surface of the wall of the tubular stem 29. The upper end of this rotary valve 42 is provided with a collar 45 having a lateral arm 46 to which is secured one end of a link 47 (Fig. 4) the opposite end of which is pivotally connected to an adjustable anchorage member 48 attached to the frame member 25. The parts are so arranged that when the applicator nozzle 30 is operatively related to the work and to the roll 26 by rearward movement of the slide 16, the arm 46 is so positioned by the link 47 that the valve 42 is disposed to register its port 44 with the opening 31, thereby permitting adhesive to flow from the pipe 34 through the opening 31 and through the valve passages 44 and 43 into the applicator nozzle. On the other hand when the slide 16 is moved forwardly to the position of Fig. 4, the port 44 in the valve 42 is moved out of registry with the opening 31 thus preventing delivery of adhesive to the applicator nozzle.

The applicator nozzle 30, Fig. 7, has a hollow head portion 49 here shown as integral with the stem 29 and having the internal chamber 50, the head having the vertical exterior surface 51,

which is the work-engaging surface opposed to the roll 26, and having the substantially horizontal, exterior flat, work-engaging bottom surface 52. The surface 51 is provided with a narrow elongate, vertical delivery slot or recess 53 (Fig. 8), one marginal wall of which is preferably notched to provide spaced, fluid distributing ribs 54. The bottom wall 52 is likewise provided with an elongate recess or slot 55 (Fig. 10) one wall of which is provided with notches to define the fluid distributing ribs 56. An orifice or aperture 57 provides communication between the chamber 50 and the slot or recess 53 and a similar orifice or aperture 58 provides communication between the chamber 50 and the slot or recess 55. The orifices 57 and 58 are of small diameter, for example of the order of 0.01 inch, the proper diameter varying with the viscosity of cement and the pressure developed by the pump.

The slots 53 and 55 are of a length respectively corresponding to the widths of the desired ribbons of adhesive to be deposited on the inner surface of the upper and on the margin of the sole member and are preferably quite narrow relatively to their lengths, for example, in the ratio of 1-4. It will be noted that the adjacent ends of these slots do not reach to the corner where the faces 51 and 52 of the applicator head intersect, but that these adjacent ends of the slots are spaced a substantial distance from said corner.

An alternative construction of the nozzle is illustrated in Figs. 13, 14 and 15. In this arrangement the head portion 49^a of the nozzle is provided with an imperforate bottom face and a rear, flat vertical face 51^a, the chamber 50 being open at the face 51^a. For cooperation with this head 49^a, there are provided two or more interchangeable cover plate 59 (Figs. 14 and 15), each of these plates being provided with an aperture 59^b for the reception of a bolt 36^x, by means of which the cover plate may be clamped firmly against the vertical face 51^a of the head 49^a. Each of these interchangeable plates 59 is furnished with a shallow recess 60 in that face which is opposed to the vertical surface 51^a of the head 49^a the recess being designed to register with the chamber 50 and being defined by a rim 61 having a flat rear face designed, leaktight, to engage the surface 51^a. This rim has windows at 62 and at 63 so that when the plate is assembled with the head 49^a, very narrow slots (for instance of 0.001 inch width) are provided leading outwardly from the recess 60 and chamber 50, these slots constituting narrow, elongate delivery orifices, one being in the rear side of the head which is opposed to the roll 26, and the other being at the bottom surface of the head. By providing a series of interchangeable plates 59 having windows 62 and 63 of different dimensions, it is possible, by interchange of these plates, to provide delivery orifices or slots of different widths and/or lengths.

The lower part of the chamber 3 in the base of the machine is preferably provided with horizontally arranged supporting rolls 64 for supporting the adhesive container 41. The rear wall (Fig. 1) of the chamber is furnished with a buffer 65 designed properly to locate the container 41 within the chamber, and the left side wall (Fig. 3) is also furnished with stops or abutments 65^a. Likewise a roll or rolls 64^a may be arranged to engage the top of the container. Containers for volatile materials, like certain adhesives, are usually provided with safety valves, as shown in Figs.

1 and 17^a, the container 41 has a vent head 66 at its top provided with spring-pressed ball valves, 93 and 94.

Referring to Figs. 18 and 19, the supply container 41 is shown as having a substantially vertical forward wall 68. This supply container will ordinarily be of heavy sheet metal and substantially air-tight so as to preserve the contents from contamination by foreign substances and from evaporation, this container preferably being the shipping container in which the adhesive is delivered to the user from the adhesive manufacturer. As illustrated in Fig. 18, the wall 68 of the container is provided with an aperture which receives a nipple 69 having a flange 70 which engages the inner surface of the wall 68, the nipple being permanently secured leaktight to the wall 68, for example, by welding metal at 71. The inner end of the nipple is finished to have a flat surface 72 against which a heavy elastic annulus or diaphragm 73, for example of rubber, rubberized fabric or the like, is securely held by a clamping ring 74 attached to the nipple by means of bolts or screws 75. This annulus or diaphragm 73 is preferably furnished with a normally small central aperture 76 converging inwardly toward the interior of the container. The nipple is also provided with an annular, radial shoulder 77 which forms a support for the outer edge of a thin septum 78 normally constituting a part of the wall of the container and which is clamped in place by a screw-threaded clamping ring 79 engaging internal screw threads in the nipple 69, the septum 78 thus constituting a part of the wall of the container during the shipment of the container from the manufacturer to the user, the septum 78 being initially imperforate and completely closing the passage through the nipple. Preferably, to protect this thin easily ruptured septum 78, during shipment, a rigid, heavy plug 80 is screwed into the nipple 69, thus protecting the septum 78 from blows which might rupture it.

The force pump 39 (Figs. 16 and 17) which supplies the fluid adhesive to the applicator nozzle has a rigid suction pipe 81 terminating in a fitting 82 providing a socket having a vertical axis in which turns the end of a rigid pipe 83 which is free to swing about the axis of this socket 82 in a horizontal plane. A rigid bracket arm 84 (Fig. 3) is pivoted upon a support 84^a carried by the base of the machine so as to swing about the same axis as the pipe 83. This bracket arm 84 is provided with an upstanding rigid bearing portion 85 at its free end, the part 85 having an opening therein (Fig. 19) for the reception of a tubular, externally screw-threaded portion of an annular clamping nut 86, the nut being free to turn in the bearing part 85. The nut 86 has an axial bore which receives a tubular element or cannula 87 having a radial shoulder 88 which engages an internal shoulder of the nut 86, the cannula having a tapering inner end portion 89 terminating in a cutting point or trocar 90. The outer end of the cannula is screwthreaded at 91 for engagement with a fitting 92 secured to the free end of the swinging pipe section 83.

When the container 41 is received from the adhesive manufacturer, the door 5 of the casing base is swung open, the bracket 84 is swung forwardly and to the right so as to leave unobstructed the passage into the chamber 3, and the container 41 is pushed into the chamber 3 and supported by the rollers 64. When the container 41 has been properly located within the chamber 3, the plug 80 is unscrewed and withdrawn from the

nipple 69, and the bracket 84 is then swung back toward normal position. As the bracket approaches its normal position, the sharp trocar end 90 of the cannula enters the nipple 69 and pierces the septum 78 and then, passing through the central aperture 76 of the diaphragm 73, dilates said aperture sufficiently to permit the tapering end of the cannula to enter through the aperture 76 into the container. The dilation of the aperture 76 in the elastic diaphragm 73 causes the latter to hug the cannula very snugly so as to provide a leaktight joint between the container wall and the cannula. The nut 86 is now screwed into the nipple 69, and by engagement with the flange 88 of the cannula rigidly holds the cannula in place so that it can not be accidentally withdrawn. The cannula thus provides an unobstructed passage from the interior of the container to the pump 39, although in the operation of so connecting the pump to the container the contents of the container have not been exposed to the outer air, and the connection is so made that there is no possibility of waste of the fluid contents of the container or the contamination of such contents with foreign material. When the container is empty, the nut 86 is retracted, the bracket 84 is swung forwardly again, thus withdrawing the cannula from the container, and the empty container is removed from the chamber 3 and may be returned to the manufacturer of adhesive for refilling.

Fig. 12 illustrates a shoe of the force-lasted type substantially as it appears after application of the cement by the apparatus above described. This shoe comprises the upper U, the sock lining S, and the wrapper W, all united by the inseam J and being assembled upon the last L. The middle or cushion sole M is also assembled with these parts, the wrapper standing upwardly as shown in Fig. 6, and being substantially perpendicular to the lower surface of the middle sole M.

In the operation of the machine, the operator after moving the slide 16 forwardly, introduces the free marginal portion of the wrapper W (at any desired point in its length) between the roll and nozzle, and then allows the slide 16 to move rearwardly, thus gripping the work between the nozzle and roll at the same time the valve 42 opens. The roll is turning and cement is now forced out through the vertical and horizontal delivery apertures in the applicator nozzle, these apertures extending, the one transversely of the width of the wrapper and the other substantially perpendicular to the edge of the middle sole, but parallel to the latter. The roll 26, if helically ribbed as suggested, exerts an upward pull on the wrapper W tending to straighten the latter out and to tension it about the edge of the middle sole; whether ribbed or not the rotation of the roll 26 tends to feed the work, that is to say, to advance the shoe as a whole relatively to the nozzle. The result is that the cement which emerges from the applicator nozzle apertures is deposited as ribbons R and R' upon the inner surface of the wrapper and upon the margin of the middle sole, respectively. Since, as above described, the nozzle apertures are spaced from the intersection of the vertical and horizontal faces of the nozzle, the ribbons of cement do not coalesce but are spaced apart, leaving an area C at the intersection of the planes of the wrapper and middle sole uncoated with cement. Thus, when thereafter the wrapper is tensioned upwardly (the cement having in the meantime set and dried) preparatory to laying it down upon the

middle sole, there is no dried and set adhesive within the crevice between the wrapper and the outer edge of the middle sole such as would interfere with such upward tensioning of the wrapper. When pressure on the treadle is released, the nozzle moves forwardly to free the work and at the same time valve 42 is closed, thus avoiding waste of adhesive.

As above referred to, the container is usually provided with a vent 66 to comply with statutory regulations concerning the shipment of inflammable fluids.

A modified construction is illustrated in Figs. 20 to 24, inclusive, in which those parts corresponding to parts above described are indicated by the same numerals. In this instance the machine frame 113 is shaped somewhat differently from the frame 13 above described, since the drive mechanism is differently arranged as will be described. However, this frame 113 (Fig. 20) is provided with horizontal guideways for the slide member 116 which supports the applicator nozzle 30 as above described. The applicator nozzle is supplied with adhesive through the pipe 34 leading from the pressure-regulating device 35 having the regulating handle 36, the fluid being supplied to the pressure regulator by means of the pipe 38 to which the fluid is delivered from the container 41 by the pump 39.

In this instance the slide 116 is actuated by a treadle (not shown) similar to the treadle 18 above described, the treadle operating a vertical rod 119 which is connected at its upper end to one arm of a bell-crank lever (Fig. 20), the other arm 120 of which is pivotally connected to the slide 116. In this instance the slide is urged rearwardly by a spring 117^a, one end of which engages a collar on the treadle rod 119, and the other end of which rests upon a portion of the machine base.

In this instance the motor 108 is mounted within a chamber in the machine frame 113, and has a power delivery shaft 109 (Fig. 20) provided with a pulley 121 which receives a belt 122, which drives a pulley 123 fixed to shaft 124 (Fig. 24) mounted in bearings 125 and 125^a carried by the machine frame. This shaft 124 is inclined downwardly and forwardly, as shown in Figs. 20 and 24, and is provided at its forward end with a roll 126 having a rim 127, preferably of some yieldable material such as rubber or a rubber composition, synthetic rubber or the like. Preferably this rim 127 has a helical rib and is of frusto-conical shape, the inclination of the axis of the roll 126 being such that the work-engaging element of the roll, that is to say that portion of the roll which contacts the work, lies in a vertical plane T, T (Fig. 24) and parallel to the vertical work-engaging face 51 of the applicator 30. The shaft 124 is preferably tubular, and within this shaft is arranged a support 128 which is keyed at 129 to the rear bearing 125^a so that the support 128 can not rotate. A spring 130 is secured to the rear end of this support 128 and permits the support to slide axially of the shaft 124 when subjected to rearwardly acting pressure. The forward end of the support 128 is bifurcated to provide vertically spaced arms 131, and between these arms is mounted a work-engaging guide roll 132 mounted to turn freely on a pin 133 fixed in the arms 131.

When the margin W (Fig. 23) of a shoe upper U is gripped between the peripheral surface of the roll 127 and the applicator nozzle 30, as illustrated in Fig. 23, the rotation of the roll with its helical rib imparts a feeding or advance motion

to the shoe, relatively to the nozzle, and at the same time creates a distinct upward pull or drag on the material of the upper tending to draw it snugly about the last L. Upward motion of the shoe as a whole is opposed by the applicator nozzle 30, whose lower surface engages the exposed surface of the sole member S. As illustrated in Fig. 23, the mechanism is being used for the application of cement to the inner surface of the upper of a shoe of ordinary construction, the upper being assembled with the sole member S upon the last L, the applicator supplying adhesive to the surface of the sole at the same time that it supplies it to the inner surface of the upper. It is obvious that this mechanism may be employed for applying cement to the wrapper and middle sole of a force-lasted shoe in the same way as the mechanism above described.

Referring more particularly to Figs. 25 to 30 inclusive, the machine is desirably provided, at least when dealing with certain classes of work, with a turning plow P designed, for example, to assist in turning the wrapper strip W downwardly, that is to say, away from the side of the shoe upper, to facilitate the application of the adhesive. When the shoe is first drawn over the last, the wrapper is usually inside out, as shown at the rear part of the shoe (Fig. 30), whereas, preparatory to the application of the adhesive the wrapper must be turned rightside out as shown at the toe end of the shoe (Fig. 30).

As here illustrated, the vertical shaft 23 is provided with a pair of vertically spaced cams 134 and 135. The cam 134 engages an arm 136 projecting laterally from a bar 137 mounted to turn and also to slide axially in bearings carried by a part 137^a secured to a convenient portion of the frame 13 of the machine. The cam 135 engages a roll which turns freely on a pin secured to the bar 137, the cam 135 tending to lift the bar 137 in opposition to the action of a spring 139 which tends to move the bar downwardly and also to hold the bar against turning. The cam 134, acting on the arm 136, turns the bar 137 through approximately one-quarter revolution for each rotation of the shaft 23. The lower end of the bar 37 carries the plow P, comprising an upwardly directed, laterally offset beak having a narrow, upper, work-engaging edge 141, and a substantially flat and vertical face 142, the face 142 being disposed substantially parallel to the side of the shoe upper at the beginning of the turning operation. As illustrated in Figs. 27, 28 and 29, the edge 141 of the plow is first engaged beneath the inside-out wrapper W and as the bar 137 rises, the edge 141 of the plow gradually lifts the wrapper to the position shown in Fig. 28. The bar 137 is then rotated until it occupies the position shown in Fig. 29 and in so doing imparts a slight twist to the wrapper which facilitates the final disposition of the wrapper as shown in Fig. 29 where it is substantially perpendicular to the surface of the sole member S. The bar 137 then moves downwardly and again turns to present the face 142 of the plow toward the outer surface of the shoe upper and the edge 141 engages a fresh portion of the wrapper and the operation is then repeated. The rapid up and down and turning motion of the plow, turns the wrapper right-side out automatically in preparation for the application of the cement, so that the operator is not obliged to turn the wrapper by hand. Since, as illustrated, this plow is located to the left of the cement-applying means, the shoe must be moved in the direction of the arrow

A (Fig. 30) so that the plow will engage and turn the wrapper before the cement-applying means acts on the wrapper. While a mechanically actuated movable plow is preferred, a stationary plow may be employed, for example a plow of the general type of the welt-turning plow shown in the patent to Kamborian 2,246,521, June 24, 1941.

I claim:

1. In an apparatus for applying ribbons of adhesive to the inner surface of the wrapper and to the margin of the middle sole, respectively, of a force-lasted shoe assembled upon a last, a nozzle, means for supplying fluid adhesive under pressure to the nozzle for concomitant delivery therefrom upon the inner surface of the wrapper and the margin of the middle sole, and a rotary feed roll having a ribbed peripheral surface disposed opposite that face of the nozzle which operatively contacts the wrapper, means for rotating the feed roll, and means operative relatively to move the nozzle and roll toward each other thereby to grip the wrapper between them.

2. In an apparatus for applying ribbons of adhesive to the inner surface of the wrapper and to the margin of the middle sole, respectively, of a force-lasted shoe assembled upon a last, a nozzle designed concomitantly to engage the wrapper and middle sole, means for supplying fluid adhesive under pressure to the nozzle for concomitant delivery therefrom upon the inner surface of the wrapper and the margin of the middle sole, a rotary feed roll adapted to engage the outer surface of the wrapper, means for rotating the roll, a support for the nozzle which is movable in a path perpendicular to the axis of the roll, means for moving the support and nozzle toward the roll thereby to grip the wrapper between the roll and nozzle, and means for moving the support and nozzle away from the roll thereby to facilitate admission of the wrapper between the roll and nozzle, the roll being constructed and arranged to cooperate with the nozzle to advance the shoe relatively to the nozzle.

3. In an apparatus for applying ribbons of adhesive to the inner surface of the wrapper and to the margin of the middle sole, respectively, of a force-lasted shoe assembled upon a last, a nozzle designed concomitantly to engage the wrapper and middle sole, means for supplying fluid adhesive under pressure to the nozzle for concomitant delivery therefrom upon the inner surface of the wrapper and the margin of the middle sole, a rotary feed roll adapted to engage the outer surface of the wrapper, means for rotating the roll, a support for the nozzle, the support being movable in a path perpendicular to the axis of the roll, spring means yieldably urging the support and nozzle away from the roll thereby to facilitate introduction of the wrapper between the roll and nozzle, and means for moving the support and nozzle toward the roll thereby to grip the wrapper between the roll and nozzle, the roll having a helically ribbed peripheral surface cooperable with the nozzle to apply an updrawing force to the wrapper, that surface of the nozzle which engages the middle sole constituting a stop to limit upward movement of the shoe whereby the wrapper is tensioned transversely by the action of the roll.

4. In a machine for coating platform covers attached to shoes, means for coating an inner margin of the cover and a combined work-feeding and cover-supporting means driven to en-

able the operator to present successive portions of the margin of the cover to said coating means.

5. In a machine of the class described having means for applying adhesive to the inner surface of the wrapper of a force-lasted shoe, a plow having an upwardly directed beak and a substantially vertical surface, means for reciprocating the plow and for simultaneously imparting a partial rotation thereto, the plow being so constructed and arranged that when in its lowermost position the flat surface of the plow is opposed to the side of the shoe and the beak is beneath the edge of the wrapper, the upward movement and rotation of the plow progressively lifting the margin of the wrapper and turning the latter right side out.

6. In a machine of the class described, means for applying a band of adhesive to the inner surface of the wrapper of a force-lasted shoe prior to its assembly with the bottom surface of a sole member, such band being spaced from the angle of junction between the wrapper and sole member when assembled, said means comprising a supporting element against which the outer surface of the wrapper bears and an applicator element for applying a band of adhesive to the inner surface of the wrapper said applicator element having a sole-engaging surface designed and arranged to bear against the bottom of the sole member and a wrapper-engaging face having a delivery orifice spaced from said sole-engaging surface.

7. In a machine of the class described, means for applying a band of adhesive to the inner surface of the wrapper of a force-lasted shoe prior to its assembly with the bottom surface of a sole member, such band being spaced from the angle of junction between the wrapper and sole member when assembled, said means comprising a supporting element against which the outer surface of the wrapper bears and an applicator element for applying a band of adhesive to the inner surface of the wrapper, one of said elements being positively driven to advance the shoe and its wrapper as the adhesive is being applied said applicator element having a sole-engaging surface designed and arranged to bear against the bottom of the sole member and a wrapper-engaging face having a delivery orifice spaced from said sole-engaging surface.

8. In a machine of the class described, means for applying a band of adhesive to the inner surface of the wrapper of a force-lasted shoe prior to its assembly with the bottom surface of a sole member, such band being spaced from the angle of junction between the wrapper and sole member when assembled, said means comprising a supporting element against which the outer surface of the wrapper bears and an applicator element for applying a band of adhesive to the inner surface of the wrapper, said supporting element being positively driven to advance the shoe and its wrapper as the adhesive is being applied said applicator element having a sole-engaging surface designed and arranged to bear against the bottom of the sole member and a wrapper-engaging face having a delivery orifice spaced from said sole-engaging surface.

9. In a machine of the class described, means for applying a band of adhesive to the inner surface of the wrapper of a force-lasted shoe prior to its assembly with the bottom surface of a sole member, such band being spaced from the angle of junction between the wrapper and sole member when assembled, said means comprising a

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rotatable support against which the outer surface of the wrapper bears and an applicator element by which the adhesive is so applied to the inner surface of the wrapper said applicator element having a sole-engaging surface designed and arranged to bear against the bottom of the sole member and a wrapper-engaging face having a delivery orifice spaced from said sole-engaging surface.

10. In a machine of the class described, means for applying a band of adhesive to the inner surface of the wrapper of a force-lasted shoe prior to its assembly with the bottom surface of a sole member, such band being spaced from the angle of junction between the wrapper and sole member when assembled, said means comprising a rotatable support and a non-rotatable applicator element between which the wrapper is introduced and by which the shoe is advanced as the adhesive is so applied by the applicator to the inner surface of the wrapper said applicator element having a sole-engaging surface designed and arranged to bear against the bottom of the sole member and a wrapper-engaging face having a delivery orifice spaced from said sole-engaging surface.

11. In a machine of the class described, means for applying a band of adhesive to the inner surface of the margin of the upper of a shoe assembled with a sole member on a last, prior to laying said margin of the upper down upon the bottom surface of the sole member, such band being spaced from the angle of junction between the upper and sole member as assembled on the last, said means comprising a support against which the outer surface of the upper bears and an applicator by which the adhesive is so applied to the inner surface of the supported upper, said applicator having a sole-engaging surface designed and arranged to bear against the bottom of the sole member and an upper-engaging face having a delivery orifice spaced from said sole-engaging surface.

12. In a machine of the class described, means for applying a band of adhesive to the margin of the bottom of a sole member assembled with an upper on a last prior to laying the margin of the upper down upon the bottom surface of the sole member, such band being spaced from the angle of junction between the upper and the sole member as thus assembled, said means comprising a support against which the outer surface of the upper bears and an applicator by which the adhesive is so applied to the margin of the bottom surface of the sole member, said applicator having a sole-engaging surface designed and arranged to bear against the sole member and an upper-engaging face, said sole-engaging surface having a delivery opening spaced from said upper-engaging face.

13. In an apparatus for applying ribbons of adhesive to the inner surfaces of the margins of the upper and of the bottom of the sole member, respectively, of a shoe assembled upon a last, a nozzle operative to deliver adhesive concomitantly to the margins of the upper and the sole member, respectively, means for supplying fluid adhesive under pressure for delivery from said nozzle, a rotary feed roll, means for rotating the roll, a support for the nozzle, the support being movable in a path perpendicular to the axis of the roll, means for urging the support and nozzle toward the roll thereby to grip the margin of the

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upper between the roll and the nozzle, and means for separating the support and nozzle from the roll thereby to facilitate admission of the margin of the upper between the roll and nozzle, and means operative to cut off the supply of adhesive to the nozzle while the nozzle and roll are so separated.

14. In an apparatus for applying a ribbon of adhesive to the margin of the bottom of a shoe sole member assembled with an upper upon a last, a nozzle having an upper-engaging face, and an orifice for the delivery of adhesive to the sole member, means for supplying fluid adhesive under pressure to the nozzle for delivery therefrom upon the margin of the bottom of the sole member, and a rotary feed roll having its peripheral surface disposed opposite to the upper-engaging face of the nozzle, means for rotating the feed roll, and means operative relatively to move the nozzle and roll toward each other thereby to grip the margin of the upper between them.

15. In an apparatus for applying a ribbon of adhesive to the inner surface of the margin of a shoe upper mounted on a last, a nozzle, means for supplying fluid adhesive under pressure to the nozzle for delivery therefrom upon the inner surface of the margin of the upper, and a rotary feed roll having its peripheral surface disposed opposite that face of the nozzle which operatively contacts the upper, means for rotating the feed roll, and means operative relatively to move the nozzle and roll toward each other thereby to grip the margin of the upper between them.

16. In a machine for coating platform covers attached to shoes, means for coating the inside surface of the cover, and a combined shoe-feeding and cover-supporting means driven to enable the operator to present successive portions of the margin of the cover to said coating means, said coating means being positioned to contact the cover at a point opposite the cover-supporting means.

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