Oct. 12, 1926. 1,602,836

J. D. REIFSNYDER

APPARATUS FOR TREATING PAPER CUPS AND THE LIKE

Filed Jan. 27, 1922 5 Sheets-Sheet 1

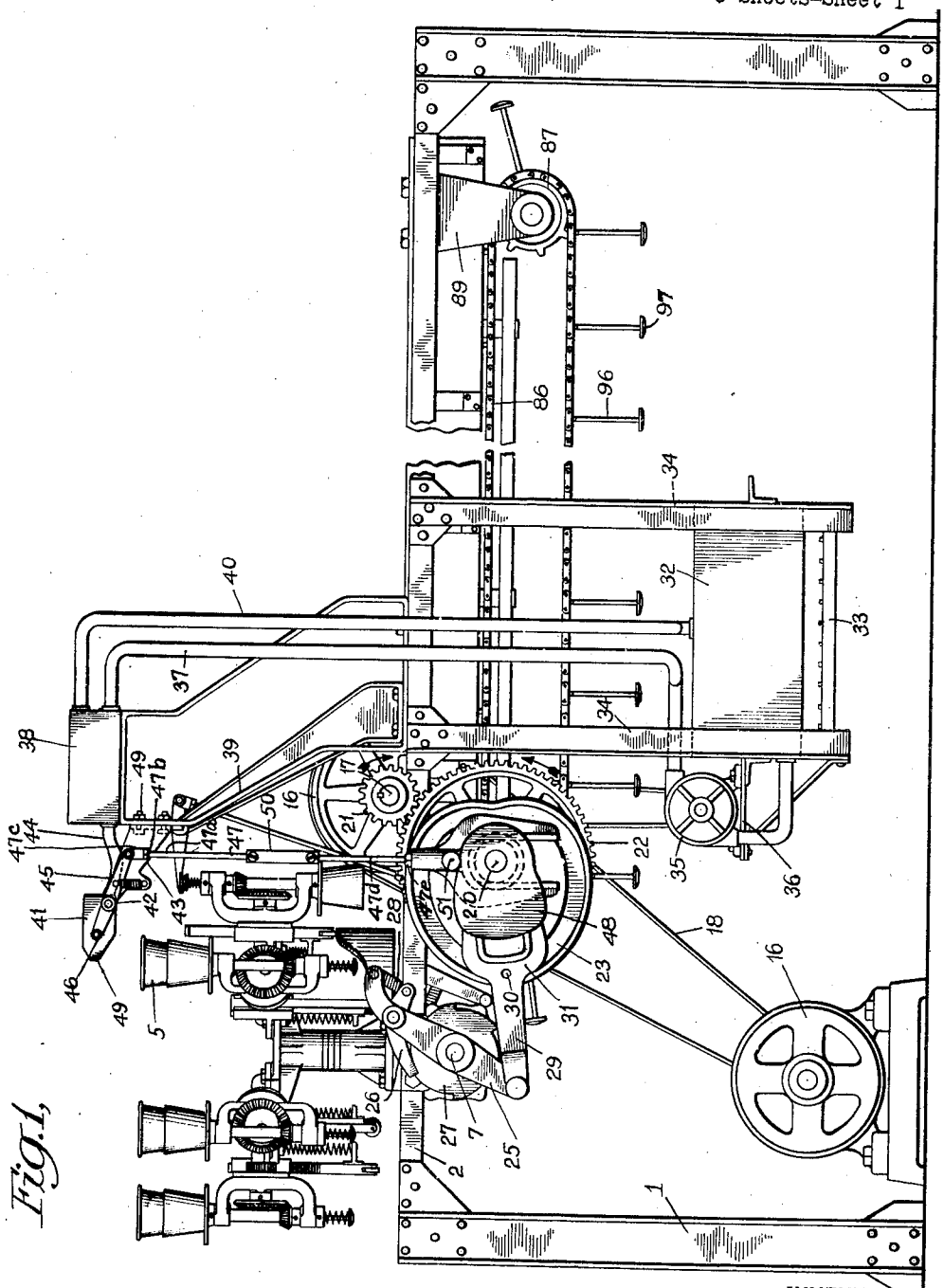


Fig. 1.

INVENTOR.
James D. Reifsnyder,
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APPARATUS FOR TREATING PAPER CUPS AND THE LIKE

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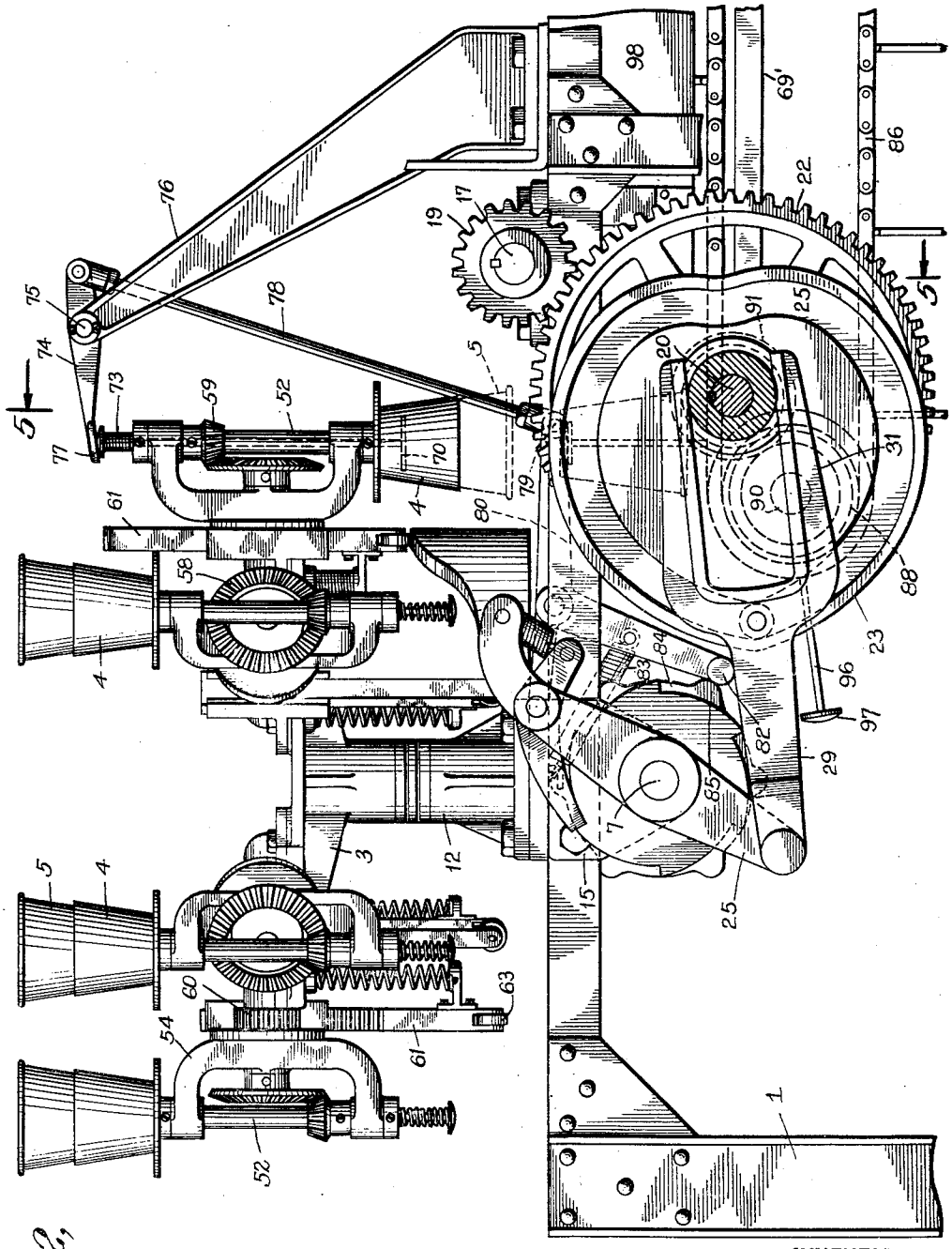


FIG. 2.

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APPARATUS FOR TREATING PAPER CUPS AND THE LIKE

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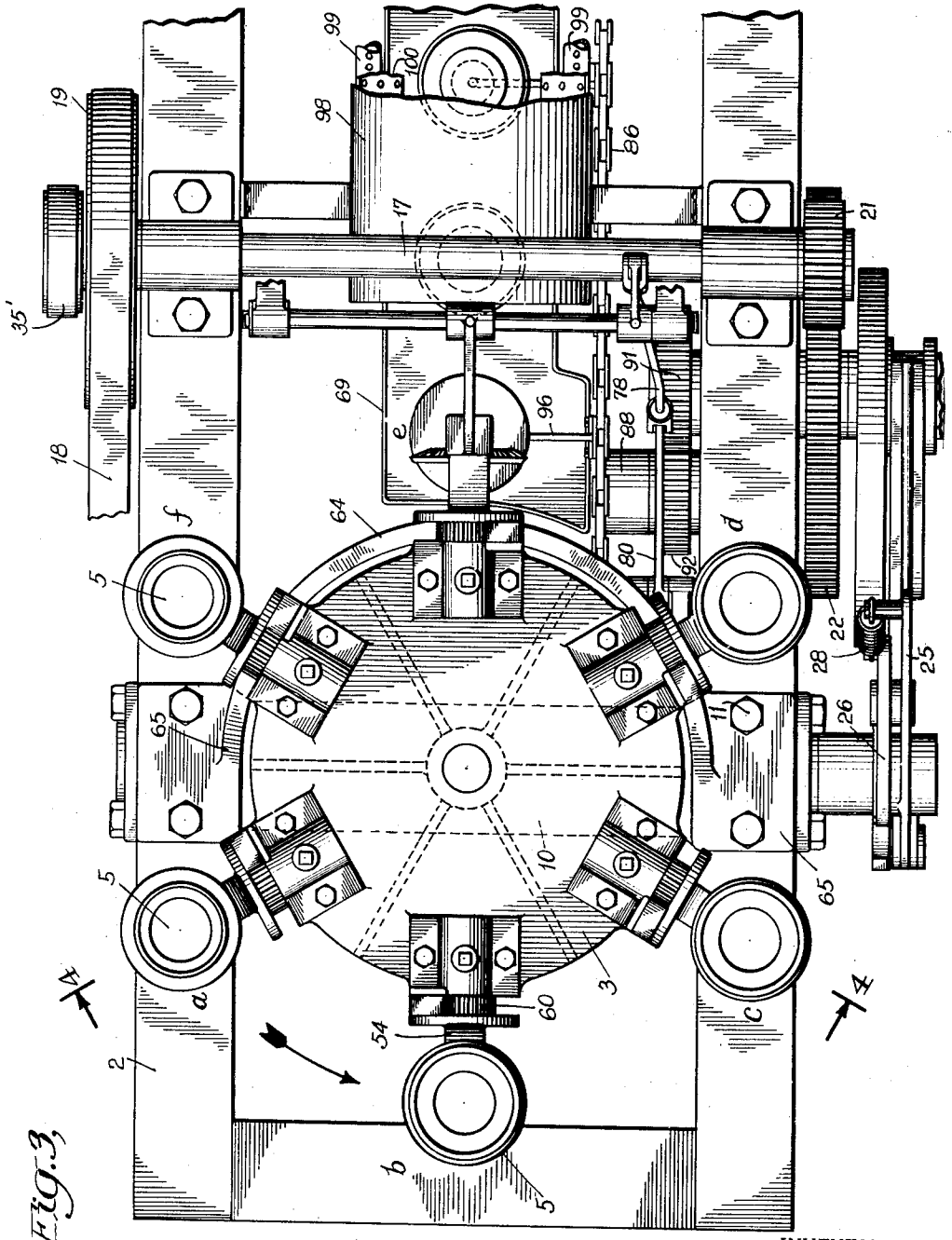


Fig. 3.

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Oct. 12, 1926. 1,602,836

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APPARATUS FOR TREATING PAPER CUPS AND THE LIKE

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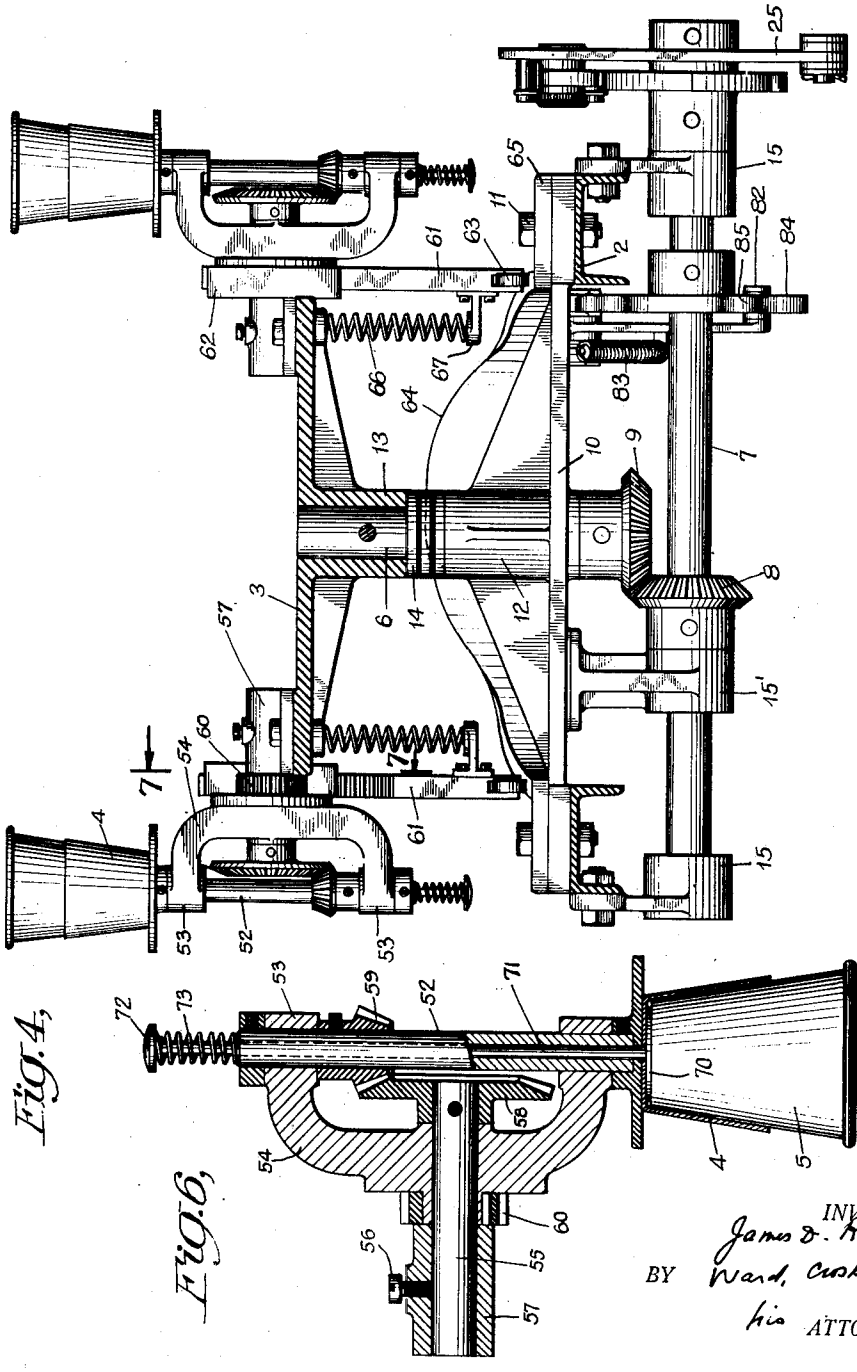


Fig. 4,

Fig. 6,

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APPARATUS FOR TREATING PAPER CUPS AND THE LIKE

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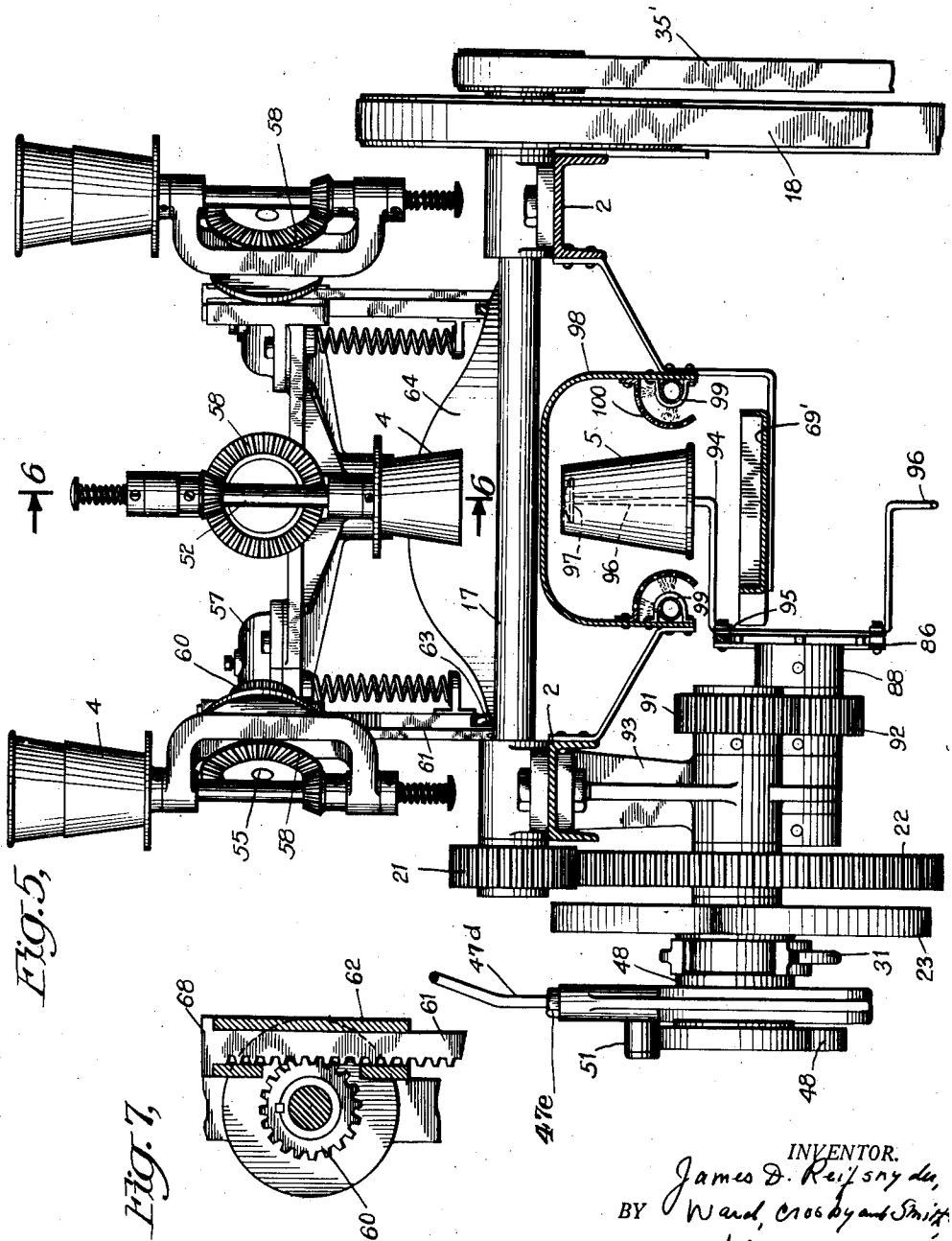


Fig. 5.

Fig. 7.

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Patented Oct. 12, 1926. 1,602,836

UNITED STATES PATENT OFFICE.

JAMES D. REIFSNYDER, OF BROOKLYN, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO TULIP CUP CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

APPARATUS FOR TREATING PAPER CUPS AND THE LIKE.

Application filed January 27, 1922. Serial No. 532,181.

The invention relates to improved apparatus for treating paper cups and the like receptacles and is especially useful for treating individual paper cups with a water proofing material. In my application "impregnated paper or like receptacle and method of making same" Serial No. 526,259, filed December 31, 1921. I have described a cup which is impregnated with a water proofing material which will not give an appreciable odor or taste when put to the lips, which will not have an appreciable coating of the indurating material thereon, particularly on its outer surface, and which will have other advantageous features, the said application also describing an improved method of making such cups. The present invention has to do particularly with a form of apparatus by which cups of the character referred to may be effectively treated or impregnated with water proofing material in the manner referred to in said application.

In accordance with the present invention apparatus is provided whereby the impregnating or treating material in the form of a molten liquid is applied to the inside of the cup and is then emptied therefrom, the method of proceeding being such that there will be substantially no coating on the outside of the cup when finished. This may be accomplished by pouring a comparatively small amount of the hot fluid into each cup and then emptying the same therefrom and at the same time imparting such a movement to the cup, or imparting such a relative movement to the cup and the fluid therein, as to cause the fluid to flow spirally over the inner surface of the cup, as it flows therefrom, or, generally, to flow in such a manner as to cause the liquid to touch upon separated portions only of the cup, extending from the bottom to the rim. The cup is then heated to spread the impregnating material, deposited on said separated areas, over the remaining inner surface of the cup.

An object of the present invention is the provision of improved apparatus whereby a process of the character referred to may be carried out in an effective manner. In the preferred form of apparatus measured quantities of hot impregnated fluid are automatically poured into the cups which are then automatically emptied and at the same time given such movements as to cause the desired distribution of the fluid over the inner surfaces of the cups as the same are emptied, after which the cups are automatically ejected from the cup holding means and carried through an oven whereby the separated liquid material on the inner surface of the cup will be caused to run and spread by capillary attraction over the entire surface. Further objects and advantages of the invention will more fully appear from the following description taken in connection with the accompanying drawings illustrating one form of apparatus embodying the invention.

Referring to the drawings, Fig. 1 is a side elevation of a form of an apparatus embodying the invention;

Fig. 2 is a partial side elevation of the same on an enlarged scale;

Fig. 3 is a top plan view of the apparatus;

Fig. 4 is a vertical section taken on line 4—4 of Fig. 3;

Fig. 5 is a vertical section taken on line 5—5 of Fig. 2;

Fig. 6 is a vertical section taken on line 6—6 of Fig. 5, and

Fig. 7 is an enlarged vertical section taken on line 7—7 of Fig. 4.

Referring to the drawings, a frame work may be employed comprising upright members 1, 1, and horizontal members 2, 2, supported thereby, which preferably take the form of channel irons, and which may be suitably secured together.

A table or support 3 is rotated step by step and carries a plurality of cup holders 4 in which the paper cups 5 which are to be treated may be carried. Table 3 is secured to a vertical spindle 6 which is rotated step by step from the shaft 7, the latter being shown as provided with beveled gear 8 meshing with a beveled gear 9 on spindle 6. Preferably a support 10 extends across the horizontal members 2, 2, to which it may be secured by bolts 11, this support having a sleeve 12 formed integral therewith or secured thereto and extending upwardly therefrom, through which spindle 6 extends. Table 3 is shown as being formed with a downwardly extending boss 13 which is

pinned to spindle 6 and which is rotatably supported on a bearing 14 at the upper end of sleeve 12.

It may be well at this point to describe briefly the various operations which are carried out by the machine. The table 3 carries a plurality, such as six, of the cup holders 4, evenly distributed around its periphery. If the table be considered as rotating in a counter-clockwise direction, as is indicated in Fig. 3, operatives may position cups in the holders 4 at any of the three lefthand positions indicated at *a*, *b*, and *c*, in Fig. 3. The cups illustrated are conical paper cups and the holders 4 are correspondingly tapered, the cups fitting fairly closely therein so that they will be held therein by friction.

In the operation of the preferred machine, when a cup holder advances from the position indicated at *c* to the next position indicated in Fig. 3 at *d*, the desired quantity of hot molten impregnating material such as paraffine and wax or the like will be poured therein, this preferably being an automatic operation. During the next step forward of the table 3, the cup holder positioned at *d* will be swung vertically through an angle of 180° so that the liquid therein will be emptied, the cup being upside down when it arrives at the position *e*. During this tilting over of the cup holder, the cup holder and the cup therein will be rotated about its own axis through a suitable angle which may be from one-half a revolution to a full revolution. This causes the liquid in the cup to flow over the inner surface thereof in a spiral like path from the bottom towards the rim so that the melted paraffine and wax will be distributed over separated portions of the inner surface of the cup along lines which are generally spiral, the surplus liquid running out over the rim of the cup and being caught in a suitable collecting vessel.

As the cup and the cup holder reach the position indicated at *e* the cup will be automatically ejected or separated from the cup holder and caught by a suitable support, upside down, and carried off, to the right, referring to Fig. 3, through a suitable oven in which the heat is sufficient to cause the spreading of the impregnating liquid over the entire surface of the cup so as to sufficiently coat and impregnate the same, the quantity of impregnating material being sufficiently small so that there will be substantially no apparent coating on the outer surface of the cup and so that there will be little or no apparent coating on the inside of the cup, while at the same time the shell of the cup is thoroughly impregnated. As a result of this treatment, when a water proofing material of relatively high melting point is used, the cup will withstand hot liquids at a temperature of about 170° F., and will have other advantageous properties. The cups will be carried in succession by a suitable conveyor through the oven and afterwards may be cooled and stacked.

After the cup has been removed from the cup holder, in the position indicated at *e*, the cup holder will be returned to its normal upright position, this operation preferably taking place during the next step forward of table 3, while the cup holder is travelling from the position indicated at *e*, to the position indicated at *f*.

Referring now to the details of the apparatus illustrated, the table 3 as stated, is given a step by step advance by connection with shaft 7 which shaft is illustrated as supported in bearings 15, 15, which may be hung from the channel shapes 2 of the frame, and by a bearing 15^1 suspended from the cross member 10.

Power for operating the machine may be taken from the motor or other source of power indicated at 16, which drives shaft 17 by a belt 18 running over a sheave 19 on shaft 17. A parallel shaft 20 is rotated from shaft 17 by suitable connections such as the pinion 21 and gear 22. A heart shaped cam 23 on shaft 20 is utilized to give an intermittent forward motion to the parallel shaft 7 previously referred to, by which table 3 is given its step by step advance.

In the form of device illustrated an arm 25 on shaft 7 carries a pawl 26 which is adapted to coact with a ratchet wheel 27 on shaft 7, this ratchet wheel having six teeth, when, as in the case illustrated, table 3 is intended to be advanced one-sixth of a revolution each step. Pawl 26 may be spring pressed into engagement with the periphery of ratchet wheel 27 by a spring 28 connected between the tail of pawl 26 and an extension of the arm 25. An arm 29 is pivotally connected to the opposite end of arm 25 and carries a roller 30 which operates in the groove of heart shaped cam 23, so that ratchet wheel 27 will be advanced one step for each revolution of cam 23. Lever 29 may be provided with bifurcated arms 31 which straddle shaft 20 so as to guide arm 29 in its forward and back movements. Shaft 20 is supported from the frame work by suitable bearings, 93.

Each cup 5 receives the desired charge of molten material when it has reached the position indicated at *d* in Fig. 3, preferably by means of the automatic devices indicated in Fig. 1. The impregnating material is contained in a tank 32 which may be heated by suitable means such as the gas burners indicated at 33, this tank being positioned adjacent the floor level between uprights 34. A pump 35 may be supported on a bracket 36 secured to one of the uprights 34 and operated by belt 35^1 from shaft 17, and serves

to continuously pump the molten liquid through a pipe 37 to an elevated tank 38 which may be supported by a frame work 39 extending upwardly above the horizontal frame members 2. An overflow pipe 40 is provided whereby the molten material constantly returns from tank 38 to tank 32, the molten material in tank 38 accordingly being maintained at a constant level.

A ladle or filling device 41 is pivotally mounted on trunnions as illustrated at 46 to a bracket 43 secured to the frame 39. A flexible connection 44 leads from tank 38 into the rear end of ladle 41, this connecting with tank 38 below the liquid level therein, so that when the ladle 41 is in its horizontal position liquid will flow through connection 44 and fill ladle 41 uniformly to the same level, a pre-determined quantity of liquid accordingly flowing into ladle 41 each operation. An arm 45 is pivotally connected at its outer end to bracket 43 at one of the trunnions 46, an intermediate point on this arm being pivotally connected to ladle 41 at the point 42. Arm 45 is pivotally connected at its rear end to a link 47. Link 47 is operated by connection with shaft 20 preferably by providing the lower end of link 47 with a roller which coacts with cam 48 secured to shaft 20. Ladle 41 is provided at its forward end with a spout or pouring opening 49 through which the molten charge in ladle 41 will flow into the cups contained in cup holders 4 as the latter successively come into alignment with the ladle at the position *d*, as shown in Fig. 3.

Cam 48 may be so constructed as to hold ladle 41 stationary, in horizontal position, for a short period of time while the ladle fills to the same level as that of the fluid in tank 38, a measured quantity of liquid accordingly being contained in ladle 41. As soon as this is accomplished link 47 will be raised by cam 48 to pour the charge of material contained in ladle 41 into the cup 5 aligned therewith, after which the ladle is again returned to horizontal position and again receives its charge of fluid material. Cam 48 makes one complete revolution during each forward and back movement of the arm 29, the timing of this device being such that a ladle 41 will empty itself into a cup 5 while the table 3 is stationary, that is while pawl 26 which advances the table is making its back stroke, ladle 41 then being returned to horizontal position, and being again filled while the table is being advanced one space by pawl 26. No valves are used in the preferred device, whereby simplicity and efficiency are enhanced. The flow of fluid to the ladle may be cut off during each operation of pouring from the ladle, by the fact that flexible connection 44 may be raised above the fluid level in tank 38 by the upward tilting of the rear end of the ladle.

Adjustment for filling ladle 41 to different levels may readily be made in various ways, as by making the height of pivots 42 of the level adjustable. This may readily be accomplished by securing bracket 43 to the frame 39 by means of bolts 49 which may extend through vertical slots (not shown) in frame 39. When this is done the link 47 will also, of course, have to be made adjustable in length. This may readily be accomplished, as by dividing the link, which has been referred to generally by the reference character 47, into several adjustable elements. As indicated in the drawings, the connection may consist of a rod 47^a screw threaded at its upper end into a threaded socket 47^b carried by a short link 47^c which is pivotally secured to the end of arm 45, rod 47^a extending at its lower end into a sleeve 50, in which it is secured against lengthwise movement relative thereto by a headed screw operating in a groove in the rod, or the like. The connection at the lower end may be similar, a rod 47^d being secured against lengthwise movement within sleeve 50 and extending downwardly therefrom and being screw-threaded at its lower end into a nut 47^e which is suitably connected to the roller 51 which coacts with cam 48.

The cup having been filled at the position *d* will now advance to the position *e* and will be turned over to empty during the passage, and at the same time will be rotated about its own axis as described. To accomplish these movements I have illustrated each cup holder as having a spindle 52 extending downwardly therefrom (Figs. 4 and 6), this spindle being rotatably mounted in bearings 53 formed in a yoke 54 which is rotatably mounted on a horizontal shaft 55. The latter is fixedly secured as by means of set screw 56 to the bearing 57 which is secured to the upper surface of table 3 adjacent the periphery thereof. Shaft 55 carries at its outer end a beveled gear 58 which is pinned or otherwise secured thereto so as to be fixed in position. The spindle 52 which carries holder 4 has a beveled pinion 59 secured thereto to rotate therewith, this pinion constantly meshing with beveled gear 58.

Each of the yokes 54 has a boss on which is secured a spur pinion 60, pinions 60 meshing with vertical racks 61, these racks being slidably mounted in suitable guideways 62 which are secured to, or are integral with, bearings 57 carried by table 3. Racks 61 are provided at their lower ends with rollers 63 which are adapted to travel over the upper surface of a cam track 64 which may extend circularly through substantially one-half a circle, immediately adjacent to the periphery of table 3, cam track 64 being secured at its two ends to the upper surfaces

of channel members 2, extensions 65 of cam track 64 being integral with or secured to the end portions of cross member 10, secured to frame members 2 by bolts 11, as previously mentioned.

Rollers 63 are held down into contact with cam track 64 by means of compression springs 66 secured at their upper ends to table 3 and having their lower ends engage brackets 67 secured to racks 61. During the passage of a cup holder from the position *d* to the position *e* the corresponding rack 61 will ride up cam track 64 from its lowest point to its highest point which results in the rotation of pinion 60, yoke 54 and the cup holder 4 through 180°, completely reversing the cup holder from the position shown in Fig. 4 to the position shown in Fig. 6. During the next advance of the machine in which the cup holder moves from position *e* to position *f*, the rack 61 referred to will ride down an incline of the cam track 64, from its highest point to its lowest point so that the cup holder will be returned to its normal vertical position when it reaches position *f*. The cup holder will remain in this position during its passage from position *f* all the way around to position *d* again, during which time roller 63 will ride off of one end of the cam track and will again ride on to the other end of the same, rack 61 having a shoulder 68 at its upper end (Fig. 7), which will rest on top of guide 62, to support the rack in its lowest position until the roller 63 at the bottom of the same again rides on to the forward end of cam track 64, adjacent to the position *d*.

During the downward tilting of the cup holder, as described, while the cup holder travels from position *d* to position *e*, the cup holder and the cup contained therein will be given a desired rotation about the axis of the cup holder by the engagement of beveled pinion 59 with beveled gear 58, the latter being stationary so that pinion 59 will rotate as it travels over the same during the downward swinging of yoke 54. This rotation, as stated, may be one of a desired extent such as from one-half a revolution to one full revolution, during which time the molten paraffine in the cup will flow towards the rim of the cup along lines which are somewhat separated from each other. The surplus liquid, that is the liquid which does not stick to the inside of the cup, will run out of the cup as the latter is reversed and fall into a drip pan 69 which may extend beneath the path of the cup holder between positions *d* and *e* of the latter. In practice a comparatively small amount of molten impregnating material will be poured into each cup 5, such for example as an amount sufficient to fill the cup from one-eighth to one-quarter full.

Each cup as it arrives at position *e* will be ejected from the cup holder and this operation is preferably carried out automatically. One way of accomplishing this result is illustrated in Figures 2 and 6 in which the cup holder is provided with a plunger 70 within the same and normally positioned against the bottom of the cup holder. This plunger, which may constitute a metal disc or the like, is carried by a rod 71 which extends through the spindle 52 on which the cup holder is mounted, the inner rod 71 extending through an opening in the bottom of the cup holder. At its opposite end the inner rod 71 extends beyond the opposite bearing 53 of yoke 54 and is provided at its end with an enlargement 72 between which and the shoulder 53 of yoke 54 a spiral spring 73 is coiled so as to normally hold the plunger disc 70 against the bottom of the cup holder.

Rod 71 is depressed, against the action of spring 73, when the cup holder arrives at the position indicated at *e*, by an arm 74 which is pivoted intermediate its ends at 75 to a bracket 76 which extends upwardly from the horizontal frame of the machine, as is shown in Fig. 2. One end of arm 74, as indicated at 77, normally rests upon or above the head 72 at the end of rod 71. A link 78 is connected to the opposite end of arm 75 and extends downwardly, its lower end being connected, as is indicated at 79, to one end of a bell crank lever 80, which is pivoted at 81 to the frame of the machine. The opposite end of the bell crank carries a roller 82 which is pressed by spring 83 into engagement with the periphery of a cam wheel 84 mounted on shaft 7. This cam wheel is provided with a number of rises 85, which will be six in number in the case of an apparatus having six spaced cup holders, as is shown herewith. The rises 85 of the cam are properly spaced so that bell crank 80 will be operated to depress its tappet 77 immediately after table 3 has completed each advance movement. This operation will result in plunger 70 being depressed, as is indicated in dotted lines in Fig. 2, to eject the cup 5 which has arrived at the position *e* upside down.

A travelling conveyor is provided for the purpose of carrying away the cups as they are ejected from the cup holders and carrying the same through a suitable oven. For this purpose I have illustrated a chain 86 running over a sprocket wheel 87 at one end and a sprocket wheel 88 at the other end. Sprocket wheel 87 is carried by brackets 89 extending downwardly from horizontal frame members 2. Sprocket wheel 88 is carried by a shaft 90 which is driven by spur gears 91 and 92 from shaft 20. It should be noted, referring to Fig. 5, that shafts 20 and 90 may be supported from one of the channel frame members 2 by brackets 93,

one of which is shown in Fig. 5; each of these brackets carrying a bearing for shaft 20 and also a bearing for shaft 90.

Chain 86 carries at properly spaced intervals supporting members 94 on which cups 5 will be received as they drop from the cup holders. Each supporting member 94 may comprise a metal rod which is secured to one of the links of the chain in any suitable manner, as is indicated at 95 in Fig. 5, the member then extending horizontally for a distance after which it is bent at right angles to extend upwardly, when it is on the upper level of the chain, or downwardly when the portion of the chain to which it is secured is returning on the lower level, as shown at 96. A head 97 is provided at the end of the vertical portion 96 upon which the cup will rest, upside down, when it has dropped from the cup holder. Supports 94 should, of course, be so spaced on the chain and the advance of the chain should be at such a rate that a support 94 will always be in position to receive a cup at the moment when the latter is ejected from the cup holder at position *e*. The cup supports are preferably off-set from the chain, as indicated, so that there will be no possibilty of molten paraffine dripping from the cups on the chain. A drip pan 69^1 will be provided to catch such drippings, this pan preferably being a continuation of the drip pan 69, previously referred to as extending beneath the travel of the cups from position *d* to position *e*.

The cups are carried by supports 94 through an oven or heating device indicated at 98. This may comprise a tunnel like cover heated by gas flames issuing from perforations in pipes 99, 99, perforated shields 100 preferably being mounted about the perforated gas pipes.

The passage of the cups through this oven will result in the spreading of the paraffine or other impregnating material over the inner surface of each cup and the impregnation of the cup with the material in the manner previously described. When the cups have been revolved about their own axes when the same are tilted downwardly, so as to cause the molten material to flow in more or less spiral lines over the inner surface of the cup walls, the effect of the heat imparted as the cups pass through oven 98 will be to cause the impregnating material to run downwardly in vertical lines and also spread by capillary attraction connecting together the various spiral lines referred to, the cups being carried through the oven upside down, as stated.

When the cups have passed through oven 98 they may be removed from the supports on conveyor chain 86 by hand, or otherwise, and stacked, or conveyed to another point for cooling. I have not illustrated any apparatus for carrying out such further steps as the same is not deemed essential.

After a cup has been ejected from the cup holder 4 at the position *e* the cup holder will be returned to its normal upright position, during the further progress of table 3, as has previously been stated, by the action of the rack 61 adjacent to that particular cup holder in descending the cam track 64 from its highest point to its lowest.

It will be noted that the tilting and emptying of each cup are preferably accomplished, by the mechanism described, in a comparatively short time, and that this occurs very shortly after the liquid is poured into the cup, so that surplus material will be removed before it has had much opportunity to be absorbed by the material of the cup. Also, that the cup is preferably given a limited rotation only, about its own axis, during the tilting, which rotation may be, for example, as stated, from one-half revolution to one revolution, so that, when a small amount of liquid is poured in the cup, this liquid will travel spirally over separated portions only of the inner surface of the cup as the latter is inverted.

It is believed that the operation of the device will be entirely clear from the above description. It should be understood that the invention is not limited strictly to the details of construction which have been described but that the invention is of considerable breadth as is indicated by the accompanying claims.

What I claim is:—

1. In apparatus of the character described, the combination of cup holding means, means for pouring a predetermined small quantity of liquid into a cup held therein, and means for moving said holding means in such a way that the relatively small quantity of liquid poured into the cup held in said holding means will flow from said cup and will, in so doing, flow over separated portions only of the inner wall surfaces thereof.

2. In apparatus of the character described, the combination of a frictional cup holder, and means for successively, in a continuous cycle, holding it upright and stationary for a short time interval while a liquid may be poured into a cup held therein, then advancing the holder and at the same time uninterruptedly tilting it to empty the cup in a comparatively short time and giving it a different motion so that the liquid in the cup will flow spirally over the inner surface thereof as it empties therefrom, and thereafter advancing the holder while returning it to upright position.

3. In apparatus of the character described, the combination of a traveling conveyor, a plurality of cup holders carried thereby, and means for uninterruptedly moving said cup

holders relative to said conveyor, during a part only of the travel of said conveyor, in such a way that liquid poured into a cup held in one of said holders will flow spirally over the inner wall surface thereof and empty quickly therefrom.

4. In apparatus of the character described, the combination of a cup holder, and means for successively holding it upright while a liquid may be poured into a cup held therein and for thereafter uninterruptedly inverting it to empty the cup quickly and at the same time giving the cup held thereby a motion of rotation about its own axis, of not to exceed a few revolutions.

5. In apparatus of the character described, the combination of an endless series of cup holders, adapted to hold the individual cups firmly in normally upright positions, means for pouring liquid into the cups, means for progressing the holders, and means for uninterruptedly tilting each holder and cup held thereby, as they reach a predetermined point, to empty the cup, and at the same time giving the holder and cup a movement of rotation about an axis extending through the cup at an angle to the axis about which it is tilted, and for thereafter returning the cup holder to normal upright position.

6. In apparatus of the character described, the combination of a cup holder, and means for successively, in a continuous cycle, holding it upright while a liquid may be poured into a cup held therein, automatically pouring a measured relatively small quantity of liquid into the cup during such time, tilting it to empty the cup and at the same time giving it a different motion so that the liquid therein will flow laterally relatively to the cup, as it empties therefrom, and for thereafter returning the cup holder to upright position.

7. In apparatus of the character described, the combination of a cup holder, means for periodically pouring a predetermined relatively small quantity of liquid into a cup held thereby, and means for tilting the cup to empty it, removing the cup from the holder, and for then returning the cup holder to upright position before said first named means is again operative.

8. In apparatus of the character described, the combination of a cup holder, means for periodically pouring a predetermined relatively small quantity of liquid into a cup held thereby, and means for tilting the cup to empty it, and at the same time giving it a different motion so that the liquid therein will flow laterally relatively to the cup over separated portions only of the inner surface of the cup, as it empties therefrom, and for then returning the cup holder to upright position before said first named means is again operative.

9. In apparatus of the character described, the combination of a cup holder, means for progressing it cyclically through a closed path, from a point at which a cup may be placed therein, and back thereto, and means for automatically pouring a measured relatively small quantity of liquid into a cup held thereby, tilting the cup holder to pour the liquid out while turning the cup about an axis different from that about which it is tilted, releasing the cup from the cup holder, and returning the cup holder to vertical position, during such progression.

10. In apparatus of the character described, the combination of a cup holder having a vertical spindle, supporting means in which said spindle is rotatably mounted, a horizontal spindle about which said supporting means is rotatable, and means for turning said supporting means about said horizontal spindle, forward and back and gear means on said horizontal and vertical spindles for at the same time rotating said vertical spindle.

11. In apparatus of the character described, the combination of a rotatable table, a cup holder having a vertical spindle, supporting means in which said spindle is rotatably mounted, a horizontal spindle about which said supporting means is rotatable, a gear secured to said supporting means, said horizontal spindle being carried by said table, a rack carried by said table, means for reciprocating said rack during the travel of said table, and means for rotating said vertical spindle during the rotation of said supporting means.

12. In apparatus of the character described, the combination of a table, means for progressing the same step by step, cup holders carried thereby, a filling device adjacent one stopping point of the cup holders, means for tilting the cup holders thereafter to empty them and simultaneously rotating them about their own axes, and means for carrying cups away from the cup holders adjacent another stopping point of the cup holders.

13. In apparatus of the character described, the combination of a table, means for progressing the same step by step, cup holders carried thereby, means for pouring liquid into cups carried by said cup holders, and means whereby said cup holders may be tilted downwards from a vertical position about a horizontal axis during a limited arc only in the progression of the table, to pour liquid therefrom, and means whereby said cup holders may be given a limited rotation about their own axes during such tilting, only.

14. In apparatus of the character described, the combination of means for pouring a relatively small amount of impregnating liquid into paper cups, successively, means for then emptying the same while

moving the cups in such a way that the liquid will flow over separated portions only of the inner surface of the cups as they are emptied, and means for then applying heat to the cups sufficient to keep the impregnating material on the cups in fluid condition for a desired period, to cause the same to spread over the remaining inner surfaces of the cups.

15. In apparatus of the character described, the combination of means for applying a limited amount of impregnating liquid to separated portions, only, of the surfaces of paper cups, successively, an oven, and means for transferring the cups, immediately after the application of such material thereto, to said oven.

16. In apparatus of the character described, the combination of means for applying impregnating material to separated portions only of the surfaces of the cups, and heating means for causing such material subsequently to spread over and through the wall of the cup.

Signed at Brooklyn, N. Y., in the county of Kings, and State of New York this 7th day of Jan. A. D. 1922.

JAMES D. REIFSNYDER.