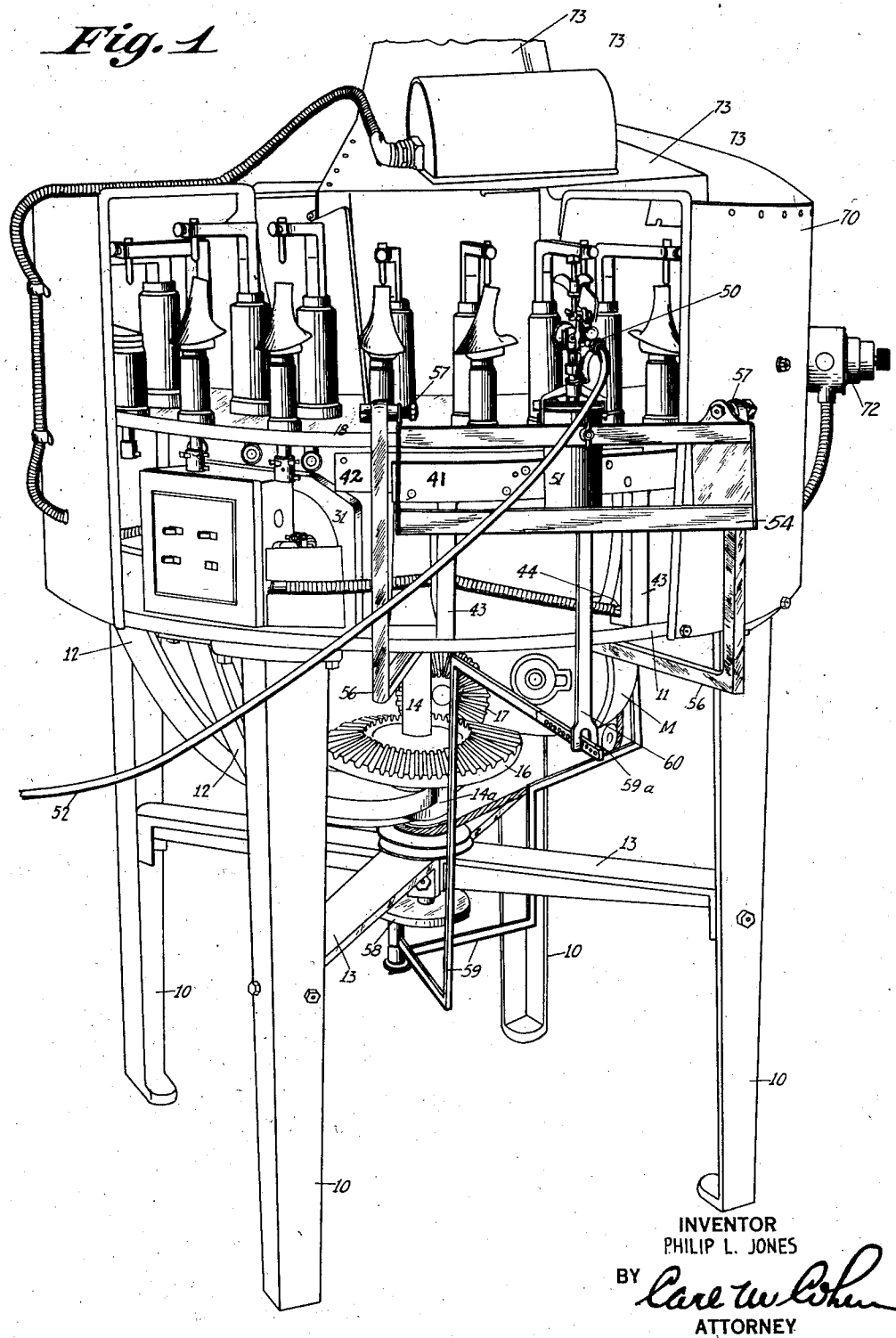
April 10, 1934. P. L. JONES 1,954,210

AUTOMATIC HEEL SPRAYING MACHINE

Filed Feb. 17, 1931 2 Sheets-Sheet 1

Fig. 1



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Fig. 5

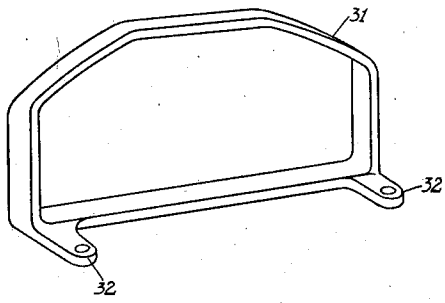


Fig. 3

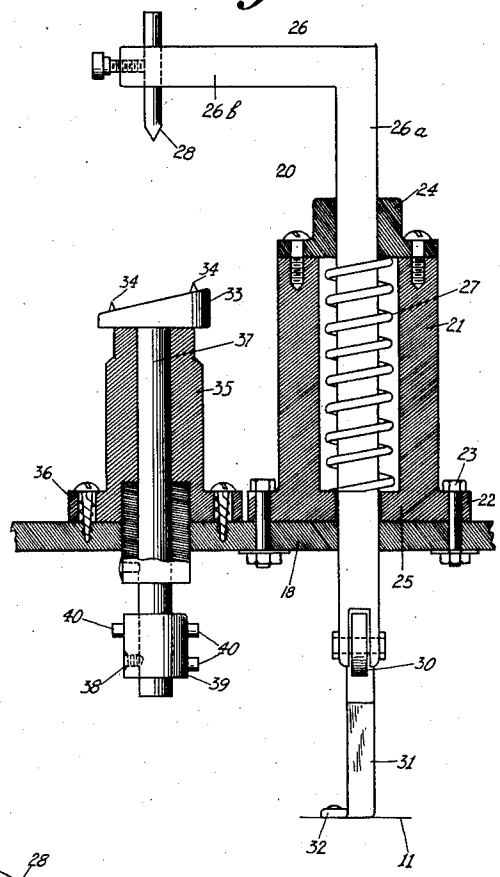


Fig. 4

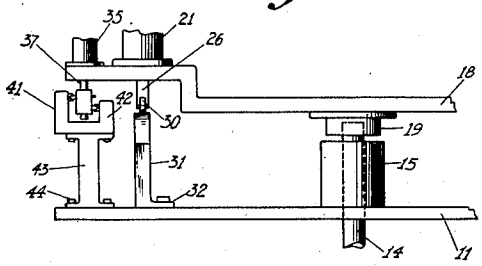
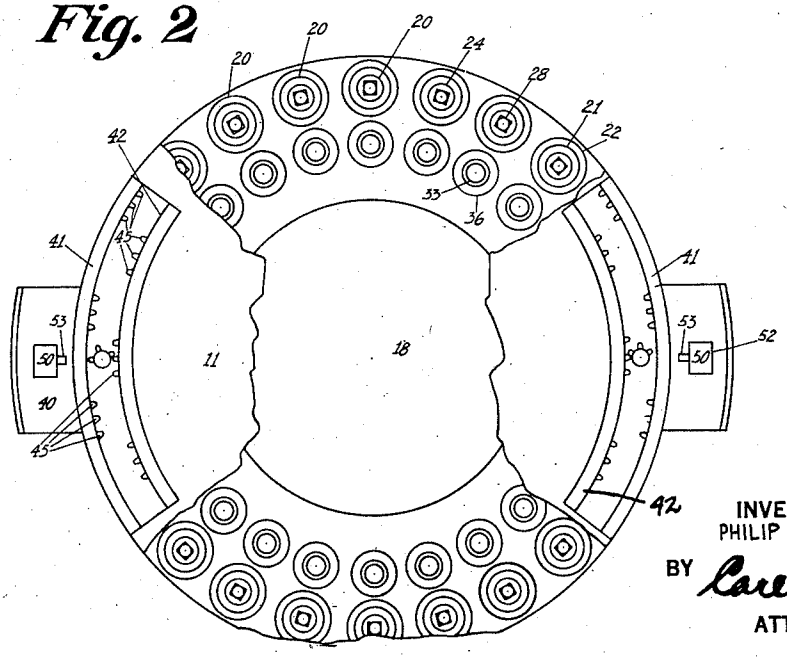


Fig. 2



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Patented Apr. 10, 1934

1,954,210

UNITED STATES PATENT OFFICE

1,954,210

AUTOMATIC HEEL SPRAYING MACHINE

Phillip Louis Jones, Haverhill, Mass., assignor to I. Miller & Sons, Incorporated, a corporation of New York

Application February 17, 1931, Serial No. 516,346

7 Claims. (Cl. 91—44)

This invention relates to an automatic machine for spraying heels or other articles with a liquid.

It is an object of this invention to provide a machine for carrying out certain steps in a process for treating celluloid covered heels by applying thereto, by means of a spray gun, coatings of certain liquid materials, such as dyes and lacquers.

It is a further object of this invention to provide a machine which automatically and uniformly sprays heels or the like.

Further, it is an object of this invention to provide a machine which sprays the article with a liquid, then dries the article preparatory to applying another coating of a liquid, and finally applies the last mentioned coating.

And it is a further object of this invention in which it is merely necessary for the operator to remove the finished articles and insert the articles to be treated, all other operations being performed automatically by the machine.

These and other objects of the invention will be readily apparent to those skilled in the art from the following description taken in connection with the accompanying drawings, in which:

Fig. 1 is a perspective view of a machine constructed in accordance with the present invention;

Fig. 2 is a detail plan view of the table;

Fig. 3 is a detail view of the work holding mechanism;

Fig. 4 is a detail view of the rotatable table, cam, and tracks which impart the motion to the work holding device; and

Fig. 5 is a perspective view of a cam which raises the work holding jack to permit the removal and insertion of the work.

Rotatable table

Referring in detail to Fig. 1 of the drawings, to the standards 10 is bolted a circular shaped table 11, to which is bolted the bracket 12. Cross struts 13 are bolted to the standards 10 to strengthen the same. Carried by the lower extremity of the standard 12 is a bearing 14*a* in which is journalled the vertical drive shaft 14. A second bearing 15 for the shaft 14 is fixed to the center of the table 11 (Fig. 4).

Keyed to the shaft 14 is the bevelled gear 16 with which the pinion gear 17 meshes. The gear 17 is coupled directly to an electric motor M which drives the same. The motor is bolted to the fixed table 11. Obviously, instead of the motor drive any other suitable drive may be employed, such as, for example, a pulley and belt connected to some external source of power. A rotatable circular table 18, preferably of the same diameter as the table 11, is supported by the shaft 14 and is fixed thereto for rotation therewith. A thrust bearing 19 supports the table by resting and rotating upon the upper surface of the bearing 15 (Fig. 4).

Work holding mechanism

Carried by the rotatable table 18 are a plurality of work holding jacks 20. The number of jacks may be varied in accordance with the desired capacity of the machine. In the present specific embodiment 24 of such jacks, equally spaced about the circumference of the table 18 are used.

Referring in detail to Fig. 3 of the drawings, the jacks 20 are seen to comprise a cylindrical sleeve 21 having flanges 22 by means of which it is bolted to the table 18 by bolts 23. The top of the sleeve is capped by a bearing plate 24, and the bottom inside portion of the sleeve has a bearing 25 in which the L-shaped spindle 26 having a shank portion 26*a* is vertically slidable. A spring 27 bearing against the plate 24 and fixed to the shank 26*a* normally urges the spindle to its lowest position, and when the spindle is raised the spring 27 is compressed, thus insuring a return of the spindle when the raising force is removed. The arm 26*b* of the spindle has at its extremity an adjustable pin 28 which is pointed to engage and hold the work. The set screw 29 permits vertical adjustment of the pin 28.

Carried by the lower extremity of the spindle 26 is a cam roller 30, which is arranged to roll over the cam surface 31 (Fig. 5). As the roller rides over the cam 31, the spindle 26 is raised and lowered. The cam 31 is bolted to the fixed table 11 through the ears 32. The cam is positioned circumferentially of the table at the position where it is desired to remove the completed work and replace new work to be operated upon. Of course, if it is desired to have more than one of such work replacing stations on the machine, a cam such as 31 should be placed at each such station to operate the work holding jack.

Still referring to Fig. 3, for cooperation with each of the jacks 26 to hold the work there is provided an anvil 33 having on its upper surface work engaging pins 34. The anvil rests on the sleeve 35 which is bolted to the table 18 at 36. To the anvil 33 is fixed a spindle 37 which is rotatable in the sleeve 35. At the end of the

spindle is fixed, by means of set screw 38, a collar 39 having studs 40 projecting therefrom.

The cam 31 and roller 30 constitute means operative to move jack 26 only from work-engaging position away from the anvil 33 to retracted-position and for holding the jack in retracted position for a predetermined length of time sufficient to permit the work to be inserted and removed. The spring 28, which is compressed during this operation, is thereafter operative to return the jack to work-engaging position under the control of said jack-moving means.

Work rotating and revolving mechanism

Having described the devices which function to hold the work in the machine, there will now be described the apparatus by means of which the work is rotated about the machine to permit the various operations to be carried out; and also the apparatus by means of which the work is reciprocated or revolved first in one direction and then in the other while the spraying operation is performed.

When the machine is operating the motor M drives the shaft 14 which turns the table 18. The work holding devices described above being fixed to the table 18, it therefore follows that the work is rotated about thereon. Thus, the work is passed by the several stations around the table where the several operations, hereinafter more fully described, are performed.

Now, when the work comes within range of the spray-guns 50, it is desired to impart to the work a revolving motion about the axis of the spindle 37, first in one direction and then in the other, whereby to make more of the work accessible to the spray.

To accomplish this, the two sets of parallel track sections 41 and 42 are positioned at that portion circumferentially of the table where this revolving motion is to be performed. The tracks 41 and 42 are supported upon the table 11 by means of the standards 43 which are bolted thereto by bolts 44. The collar 39 is adapted to pass between the tracks 41 and 42 as the table 18 rotates. Mounted on the inside of each track are studs 45. These studs contact with the studs 40 as the collar 39 passes between the tracks 41 and 42. Viewing Fig. 2, if we assume the table is rotating in a clockwise direction, the studs 45 carried by the outside tracks 41 will contact with the studs 40 to revolve the spindle 37 and its anvil 33 in a counter-clockwise direction; and when the studs 40 engage with the studs 45 carried by the inside tracks 42, the spindle 37 and anvil 33 will revolve in a clockwise direction. It remains, therefore, merely to space the studs 45 along the tracks 41 and 42 in groups so that as the table rotates the studs will alternately revolve the spindle 37 in one direction and then the other. In practice it has been found desirable to provide the tracks with a continuous line of holes into which a desired number of studs 45 may be fixed, thus insuring flexibility and adjustability in the revolving motion imparted to the spindle 37. The studs may be screwed into the holes in the tracks, or may alternatively be secured thereto by any suitable means.

Spraying mechanism

Located on opposite sides of the table are two spray guns 50 (Figs. 1 and 2) which apply the coating materials, such as the dyes and lacquers. The spray gun 50 is of the usual atomizer type having a reservoir 51 which holds the liquid, and is fed thereto through pressure hose 52, which is connected to any suitable air storage tank (not shown). The nozzle 53 of the gun 50 sprays a vapor of the material in the reservoir upon the work. It will be understood, of course, that the air supply may be turned on and off to start and stop the spray manually or automatically in any manner well known in the art.

In order to get a wide and uniform distribution of the material sprayed upon the work the carriages 54 are provided as the means to hold the gun 50 and reservoir 51 and the said carriages are given a rocking motion, whereby to direct the spray upwardly and downwardly of the work. Brackets 56 fixed to the table support each carriage by the pivots 57, which permit the carriage to rock thereabout. An eccentric cam 58 fixed to the bottom end of the shaft 14 for rotation therewith has connected to it the bell-crank levers 59 to which is connected the link 60 which is fixed at its opposite end to the carriage frame. The angle through which the carriage is rocked may be adjusted by the adjustable connection between the end 59*a* of the bell crank lever 59 and the end of the link 60.

Drying ovens

In order to facilitate the drying of the material which has been sprayed upon the work, the two drying ovens 70 and 71 are fixedly mounted upon the table 11 and as the table 18 rotates the work is carried therethrough. An electrical heating unit (not shown) having the switch 72 is provided for heating each of the heating ovens. A hood 73 which may be connected to a blower or any other suitable ventilating source carries off the excess vapors.

Operation of the machine

The operation of the machine is as follows:

Assuming that there is no work in the machine, all the jacks are empty. Now, the switch is turned on starting the driving motor M, which causes the table 18 to revolve, and during this revolution the cam rollers 30 ride up on the cam 31, thus raising the pin 28. The work W, such as a wooden heel for a lady's shoe, is now placed upon the anvil 33 and as the table 18 revolves further the roller 30 passes by the cam 31, permitting the spring 27 to clamp the pin down and thus holding the work upon the anvil 33. Each jack is thus loaded in turn in a similar way.

The loaded jack is now passed on into the path of the spray which is issuing from the gun 50. Through the eccentric cam 58, the bell-crank 59, and the link 60, the rotation of the shaft imparts a rocking motion to the carriage 54, which in turn causes the nozzle of the gun 50 to be directed upwardly and downwardly over the work as it passes by the nozzle.

Also, as each of the work holding jacks and anvils come into range of the spray guns the collar 39 passes between the tracks 41 and 42 upon which are mounted groups of lugs which cooperate with the lugs on the collar to revolve the anvils first in one direction and then the other, thus causing all of the lateral surfaces of the work to be presented in turn directly in the path of the spray. After the work passes one spray gun it travels along through the heated oven and from there to the next spray gun which again coats it in the same manner as does the first mentioned gun. The work travels on further, as the table 18 revolves, and the work passes through

the second heater. After emerging therefrom the jack again comes into cooperation with the cam 31, which raises the pin 28, permitting the removal of the finished work and the insertion of new work. The cycle is now repeated.

Having thus described my invention, I claim:

1. A machine of the class described comprising in combination, a fixed table, a rotatable table, means to revolve said last mentioned table, a plurality of work holding means carried by said table, said last mentioned means being revoluble first in one direction and then in the other as the table is revolved, means to revolve said work-holding means in said two directions alternately, means to spray the work held by said work holding means, means to reciprocate said spraying means, means to heat said work to dry the same, and means to remove excess vapors from said work.

2. A machine of the class described comprising in combination, a fixed table, a rotatable table, means to revolve said last mentioned table, a plurality of work holding means carried by said table, said last mentioned means being revoluble first in one direction and then in the other as the table is revolved, means to revolve said work-holding means in said two directions alternately, means to spray the work held by said work holding means, and means to reciprocate said spraying means, said last mentioned means being connected to said means which revolves said table.

3. A machine of the class described comprising in combination, a fixed table, a rotatable table above said fixed table, an anvil to support work, said anvil being carried by said rotatable table and having a projecting portion, means mounted upon said fixed table to cooperate with said portion to revolve the same as the table is rotated, means to clamp said work upon said anvil, said clamp means having a depending portion extending below said rotatable table and a cam mounted upon said fixed table and adapted to engage said depending portion whereby to render said last mentioned means ineffective to clamp the work during the rotation of said rotatable table.

4. In a machine of the class described having a rotatable table upon which work is to be held, an anvil to hold said work, a jack vertically slidable with respect to said anvil between work-engaging and work-releasing positions, a spring effective in itself to move said jack to work-engaging position, and a cam for moving said jack to work-releasing position and for holding said jack in work-releasing position.

5. In a machine of the class described, a fixed table, a rotatable table above said fixed table, an anvil on said rotatable table to hold said work, a jack movably mounted in said rotatable table and cooperating with said anvil to hold the work thereon, said jack having a depending portion extending between said fixed and rotatable tables, and a cam on said fixed table adapted to engage said depending portion for moving said jack with relation to said anvil.

6. A machine of the class described comprising in combination, a fixed table, a rotatable table, a work supporting anvil mounted on said rotatable table for movement therewith and for rotation relatively thereto, said anvil having vertically spaced projecting portions, and vertically spaced means on said fixed table adapted to cooperate with said vertically spaced portions on said anvil to revolve the same alternately in opposite directions as the table is rotated.

7. In a machine of the class described, a fixed table, a rotatable table, an anvil mounted on said rotatable table for movement therewith and for rotation relatively thereto, said anvil having vertically offset groups of laterally projecting studs, a group of studs on said fixed table adapted to engage a group of said studs on said anvil for rotating said anvil in one direction, and another group of studs on said fixed table peripherally and vertically offset from said first mentioned group of fixed-table studs adapted to engage another group of studs on said anvil for rotating said anvil in a different direction.

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