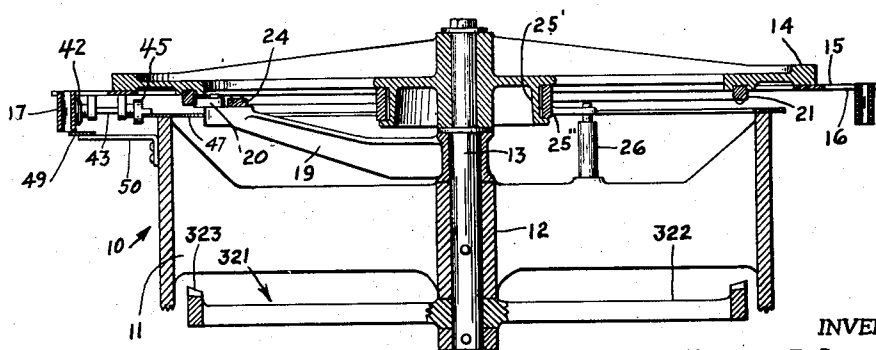
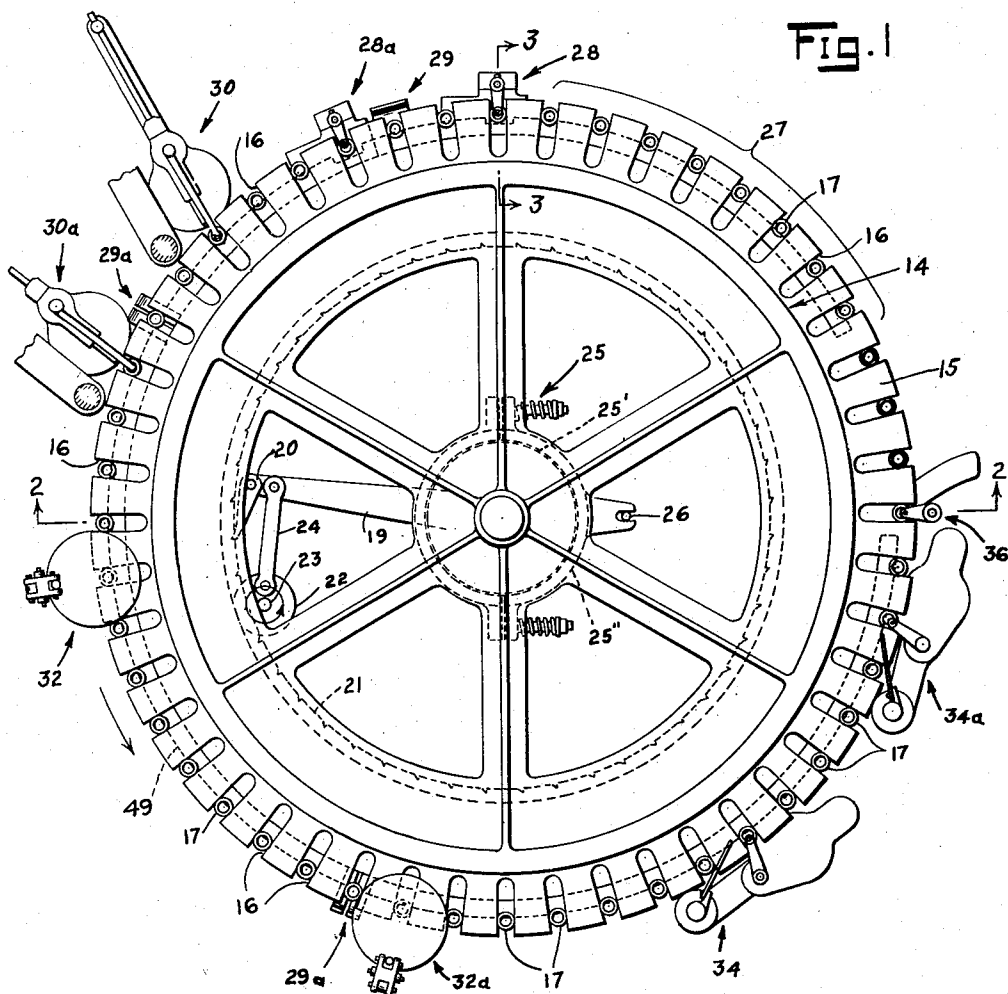


H. I. DANZIGER
MACHINE FOR APPLYING SOLDER TO THE
ENDS OF CONDENSER BODIES

2 Sheets-Sheet 1

Original Filed Sept. 28, 1942



Harold I. Danziger
George H. Fritzynger
ATTORNEY.

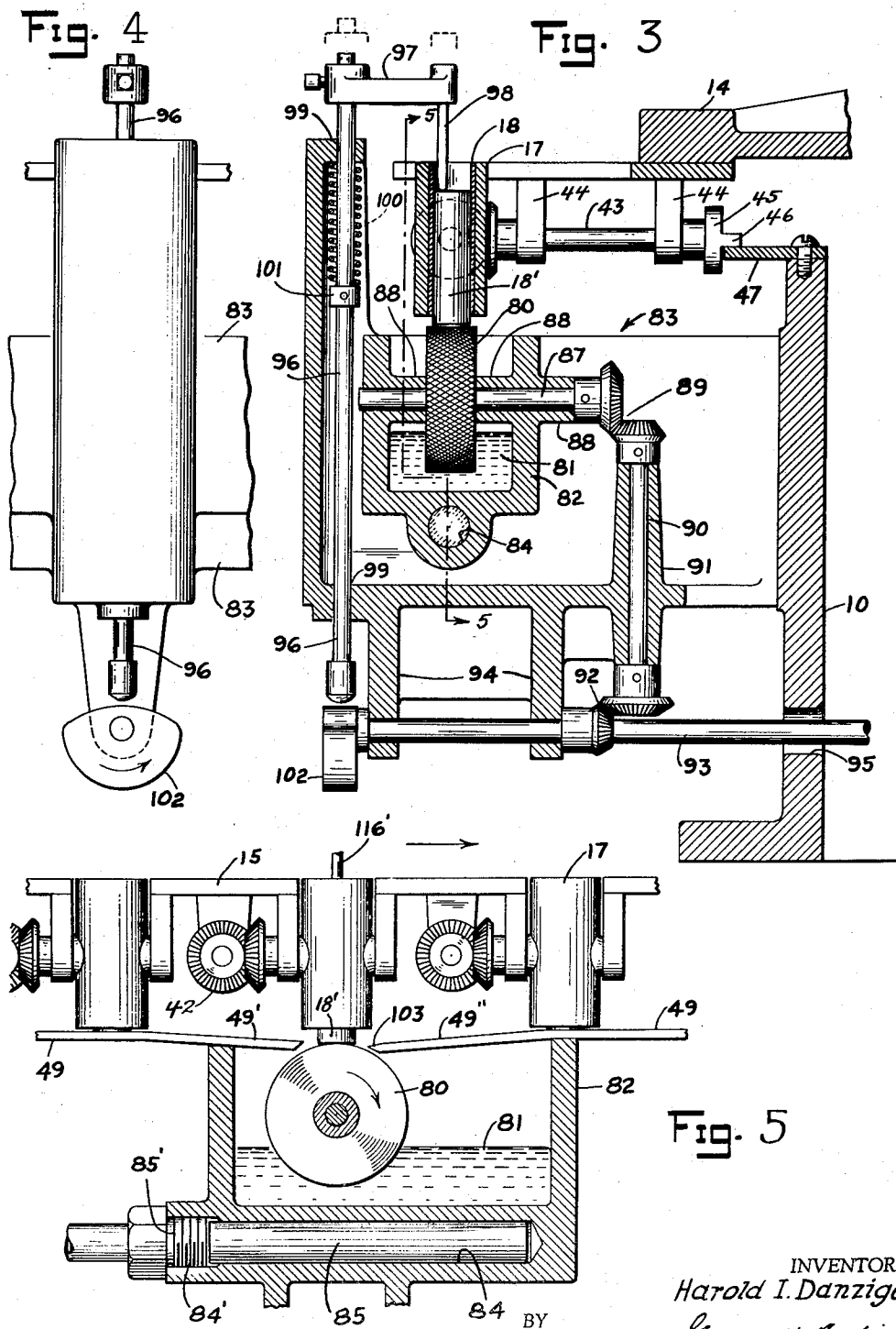
June 6, 1950

H. I. DANZIGER
MACHINE FOR APPLYING SOLDER TO THE
ENDS OF CONDENSER BODIES

2,510,463

Original Filed Sept. 28, 1942

2 Sheets-Sheet 2



INVENTOR.
Harold I. Danziger
George H. Fritzinger
ATTORNEY.

UNITED STATES PATENT OFFICE

2,510,463

MACHINE FOR APPLYING SOLDER TO THE
ENDS OF CONDENSER BODIES

Harold I. Danziger, West Orange, N. J.

Original application September 28, 1942, Serial
No. 460,016. Divided and this application Oc-
tober 11, 1946, Serial No. 702,873

3 Claims. (Cl. 91—12.2)

1

This application is a division of my pending application Serial No. 460,016 (now Patent No. 2,419,484), filed September 28, 1942, and entitled Condenser assembling machine. The present invention relates particularly to machines for coating the ends of condenser bodies with solder to prepare the bodies for the subsequent soldering of terminals thereto.

It is an object of my invention to provide an efficient commercial machine for the purpose stated.

It is another object to provide an improved coating machine which is adapted to coat automatically the ends of condenser bodies fed thereto in succession.

It is another object to provide a coating machine which is adapted for combination with assembling machines to produce electrical condensers automatically on a commercial basis.

A further object is to provide a coating machine of simple and novel mechanism.

These and other objects of my invention lie in the details of construction, arrangement of parts and combinations of elements which are incorporated in the embodiment of my invention herein particularly shown, and will be apparent from the following description and the appended claims.

In the description of my invention reference is had to the accompanying drawings, of which:

Figure 1 is a top plan view of a condenser assembling machine in which my invention is incorporated;

Figure 2 is a vertical section taken substantially on the line 2—2 of Figure 1;

Figure 3 is a fractional vertical section, to enlarged scale, taken substantially on the line 3—3 of Figure 1 and showing the coating device according to my invention;

Figure 4 is a fractional front elevation of the device of Figure 3; and

Figure 5 is a vertical section taken substantially on the line 5—5 of Figure 3.

The coating device of my invention has been incorporated in a complete machine for automatically assembling electrical condensers, wherein the device tins—i. e., coats with solder—the ends of the condenser bodies to prepare them so that terminals may next be soldered thereto as described in my above mentioned parent application. This coating device may be employed without the other assembling components of this assembling machine but with parts of the frame and feed mechanism to provide a complete coating machine wherefore such parts of the assem-

2

bling machine as are necessary to form a complete coating machine are herein next described.

In Figures 1 and 2 there will be seen a main frame 10 of a generally circular form as viewed from the top. This frame has radial webs 11 supporting a central bearing 12 in which there is journaled a vertical shaft 13. Carried by the shaft 13 above the frame is a circular table 14 comprising a central spider and a circular horizontal shelf 15 disposed about the periphery of the spider. In the shelf at equally spaced intervals are radial slots 16, and disposed in each slot is a tumbler 17. These tumblers are in the form of tubes having bores to receive snugly the shells 18 and condenser bodies 18' which are to be coated.

In the operation of the machine, the table is advanced with an intermittent rotary motion in a counterclockwise direction, the distance of each interval of advance being such as to move each tumbler 17 into the position previously occupied by the one immediately ahead of it. This intermittent advance of the table is effected by a ratchet mechanism comprising a lever 19 pivoted on the shaft 13 beneath the table and pivotally carrying a pawl 20 which engages a circular rack 21 mounted on the underside of the table. A reciprocatory movement of the lever such as will advance the table intermittently an interval at a time is effected by a rotating wheel 22 carried by a shaft 23 and coupled by a link 24 to the lever 19. A brake 25, which comprises a drum 25' and a brake band 25'' that frictionally embraces the drum and is held stationary to the frame by a post 26, serves to prevent inertia over-running of the table at the end of each advance and to hold the table stationary between successive advances.

The tumblers are journaled to standards which depend from the shelf 15 at opposite sides of each slot 16. This journalling is done so that the tumblers may be inverted to permit like operations on opposite ends of the condenser bodies by identical mechanisms, but for the purposes of the present invention the tumblers may be fixedly held to the shelf in upright positions as shown. Such upright positioning of the tumblers is maintained by coupling a trunnion of each tumbler by gearing 42 to a radially extending shaft 43 journaled in standards 44 of the shelf, and by locking the shafts 43 by securing heads 45 to the ends thereof which have horizontal diametrical tongues 46 that slide, as the table is moved, on stationary arcuate plates 47 carried by the frame 10. In order to retain the condenser bodies in the tumblers, there are provided stationary plates 49, held by brackets

3

50 to the frame 10, which lie below the tumblers and extend along the path of travel thereof to slidably support the condenser elements. These stationary plates have open spaces at certain stations to permit assembling operations on the lower ends of the condenser bodies and automatic ejection of the bodies from the machine as will hereinafter appear.

The operation of the overall machine shown in Figures 1 and 2 may be briefly noted. At the place designated by the reference numeral 27 in Figure 1 there is a loading station whereat the condenser shells 18 and bodies 18' are inserted by hand in the successive tumblers as the table is advanced. Following the loading station there are, in the sequence here-named, a first tinning station 28 for coating the lower end of each condenser body with solder, a turning station 29 for inverting the tumblers, a second tinning station 28a, a soldering station 30 for securing a terminal to the lower end of each condenser body, a second turning station 29a, a second soldering station 30a, a sealing station 32 for sealing the upper end of each shell, a third turning station 29a, a second sealing station 32a, a testing station 34 for testing each condenser for short circuits and ejecting it if it is defective, a testing station 34a for testing each condenser for capacity and ejecting it if its capacity exceeds prescribed tolerances, and an ejecting station 36 for ejecting each condenser from the machine which has passed the testing stations.

The present invention is concerned particularly with the tinning station 28 and is herein next described in detail.

The tinning station 28, which is shown in detail in Figures 3, 4 and 5, comprises a continuously rotating roller 80 partially immersed in a molten solder bath 81. The peripheral surface of the roller is provided with small pockets, as by knurling, in order that it may effectively pick up the solder and carry it from the bath as the roller rotates. Each condenser body conveyed from the loading station to the tinning station is moved directly overhead the roller 80; then while the table is at rest the condenser body at this station is pressed down through its shell onto the knurled surface of the roller. Solder is thus carried to the condenser body to tin the lower end thereof.

The solder bath 81 is contained in a trough 82 which is supported by an outwardly extending, subsidiary frame portion 83 of the main frame 10. In the bottom wall of the trough there is a chamber 84 in which there is housed an electrical heating unit 85 for maintaining the solder bath in a properly heated state, the open end portion 84' of the chamber being counter-bored and threaded to receive a threaded hub portion 85' of the heating unit whereby to hold the unit in place. The roller 80 is secured to a horizontal shaft 87 which is journaled in bearings 88 provided in the side walls of the trough. The shaft 87 is coupled through right-angle bevel gearing 89 to a vertical shaft 90 which is journaled in a bearing 91 of the frame 33; this vertical shaft is in turn coupled through right-angle bevel gearing 92 to a horizontal drive shaft 93 journaled in standards 94 of the frame 33. The drive shaft 93 extends inwardly through an opening 95 in the main frame 10. Within the frame this shaft has a drive connection with a unitary drive mechanism for the machine, from which the shaft receives continuous movement at a rate of one revolution for each step of advance

4

of the table. This drive mechanism, which may be of any suitable form, need not be herein described as reference to one suitable form thereof may be had in my abovementioned parent application.

Successive ones of the retaining plates 49 are spaced apart at the tinning station, and the open space between the ends of the plates is occupied by the top portion of the roller 80, the roller being positioned though at a level somewhat below that of the lower ends of the tumblers as is shown in Figure 5, this lowered positioning of the roller being to prevent the depositing of solder onto the tumblers. The end portion 49' of the retaining plate which precedes the roller in respect of the direction of advance of the table, is inclined downwardly substantially to the level of the top portion of the roller. Thus, the condenser bodies, as they are conveyed to the tinning station, are permitted to move down gradually by their own weight onto the roller. However, to insure not only a contact but also a definite pressure of each condenser body against the roller, each condenser body is spring-pressed against the roller during the interval of its occupancy of the tinning station. The mechanism for so pressing the condenser bodies against the roller includes a plunger rod 96 at the side of the table which has an arm 97 at its upper end overhanging the shelf 15 and carrying a downwardly extending pin 98 in line overhead with the bore of the tumbler at the tinning station. The plunger rod 96 slides vertically in a pair of spaced bearings 99 of the frame 33, and is biased downwardly by a compression spring 100 interposed between the upper one of the bearings 99 and a collar 101 on the rod. The plunger rod is controlled at the bottom by a cam 102. This cam is of the one-lobe type and is mounted on the outer end of the aforementioned drive shaft 93 to receive one revolution of movement for each step of advance of the table. The cam is timed in relation to the ratchet advance for the table so that the lobe thereof will engage the plunger rod and hold it in a raised position, wherein the pin 98 clears the tumblers, while the table is in movement and so that the recession of the cam will traverse the end of the plunger rod and free the rod to move down under the influence of the spring 101 while the table is at rest. When the plunger rod is so moved downwardly, the pin 98 enters the tumbler at the tinning station and presses the condenser body which is within this tumbler down onto the roller 80, the movement of the condenser body being relative to the shell as the latter tightly fits and is held stationary to the tumbler. This relative movement of the body to the shell has the advantage of preventing solder from being deposited onto the end of the shell.

As the table advances, the condenser body at the tinning station is slid off from the roller 80 onto the end portion 49' of the next succeeding one of the retaining plates 49, there being a bevel 103 on the end portion 49' so that the condenser body may pass smoothly from the roller onto the plate, as is shown in Figure 5. This end portion 49' is inclined upwardly so as to cam the condenser body back to its normal level within the tumbler as the body is conveyed one step of advance beyond the tinning station.

While I have herein shown the condenser bodies 18' as being placed within respective shells 18, it will be understood that the shells are unnecessary to the functioning of the coating ma-

5

chine of the present invention and may therefore be omitted.

Preferably, the present coating machine includes the station 35 for ejecting the coated condensers from the machine. Also, it may desirably include a turning station 29 and a second tinning station so that both ends of each condenser are automatically coated. However, these additional stations form no part of the invention herein claimed and need not be herein described.

The embodiment of my invention herein particularly shown will be understood to be illustrative and not limitative of my invention as the same is subject to changes and modifications without departure from the scope of my invention, which I endeavor to express according to the following claims.

I claim:

1. In a machine for coating the ends of condenser bodies with solder, including a frame: the combination of a conveyor movably mounted on said frame and having thereon equally spaced holders for receiving condenser bodies in upright positions; drive means for intermittently advancing said conveyor by successive distances equal to the spacing between successive ones of said holders; stationary support means on said frame below said holders for slidably supporting said condenser bodies as said conveyor is moved, said support means having an open space at a rest position of successive ones of said bodies; a solder bath; an endless solder-transmitting means moved from said bath to said open space; and means coupled to said drive means and operated intermittently thereby during successive rest periods of said conveyor for pressing successive ones of said condenser bodies against said solder transmitting means.

2. A machine for applying solder to the ends of a series of condenser bodies in succession, comprising a conveyor having a series of equally spaced devices for holding said condenser bodies respectively; a heated solder bath; a single applicator for carrying solder from said bath to a

6

station adjacent to the path of said condenser bodies; means for intermittently advancing said conveyor by successive distances equal to the spacing between successive ones of said holding devices whereby to move said bodies successively to said station; reciprocating means at said station for moving each condenser body transversely to said path against said applicator; and means coupling said reciprocating means to said advancing means for causing the former to be operated in timed relation with the advance of said conveyor whereby each condenser body is moved against said applicator when the condenser body reaches said station and while said conveyor is at rest.

3. The combination set forth in claim 2, including spring means acting on said reciprocating means in a direction to urge a condenser body against said applicator, wherein said coupling means is adapted to hold said reciprocating means in a retracted position during each advance of said conveyor and to release the reciprocating means for operation yieldably against the condenser body by said spring means while said conveyor is at rest.

HAROLD I. DANZIGER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
692,040	White	Jan. 28, 1902
808,760	Heybach	Nov. 7, 1905
1,810,223	Peterson	June 16, 1931
1,954,733	Hansen	Apr. 10, 1934
2,038,525	Cate	Apr. 28, 1936
2,057,037	Kronquest	Oct. 13, 1936
2,069,386	Palucki	Feb. 2, 1937
2,079,563	Reuter	May 4, 1937
2,087,809	Nichols et al.	July 20, 1937
2,257,740	Goebel et al.	Oct. 7, 1941
2,387,673	McCullough et al.	Oct. 23, 1945