Sept. 21, 1948. J. FLAWS, JR 2,449,648

METHOD OF AND APPARATUS FOR MANUFACTURING FLASH LAMPS

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Fig. 1.

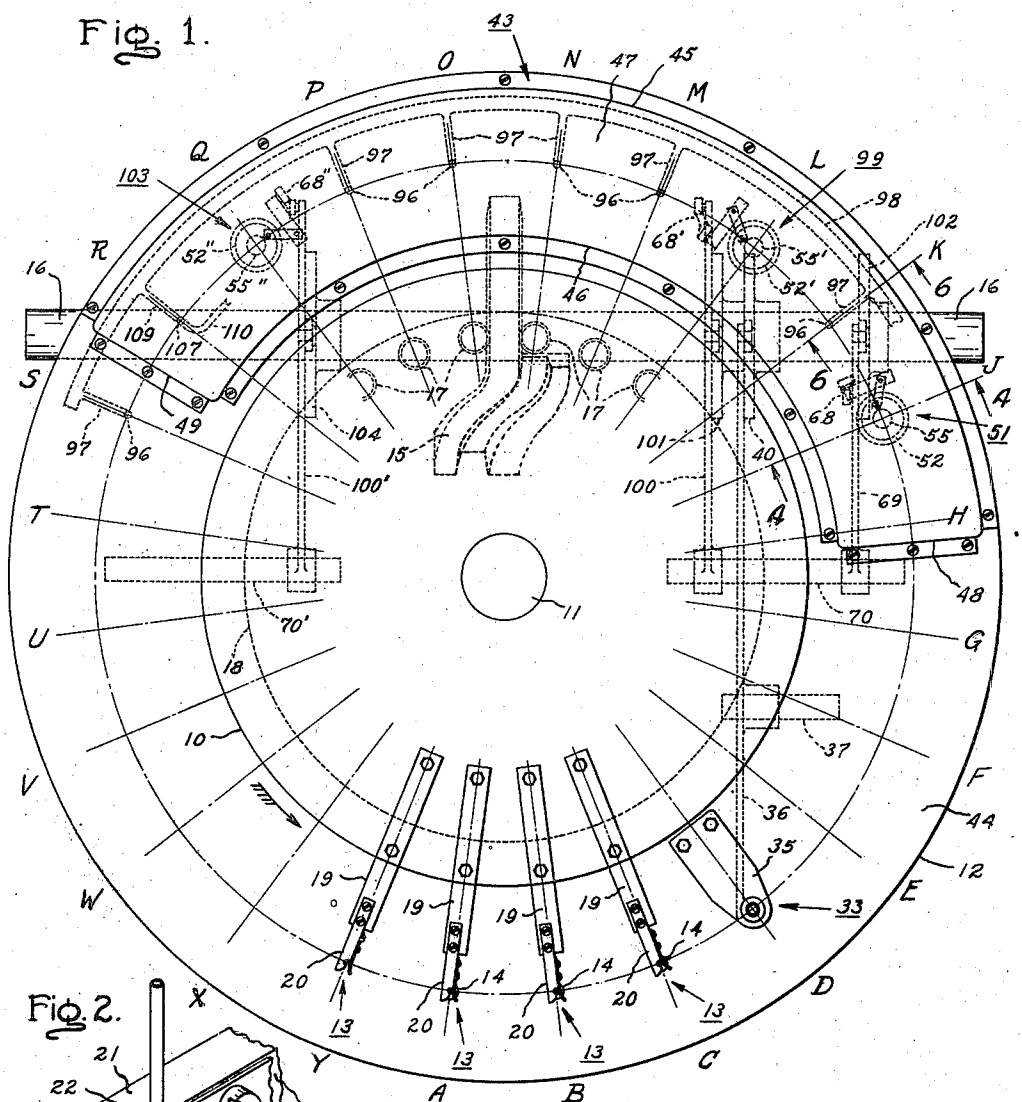
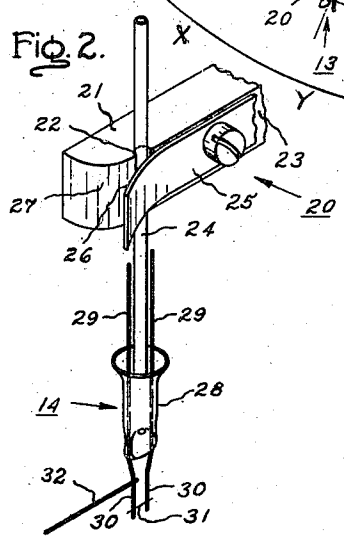


Fig. 2.



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Fig. 3.

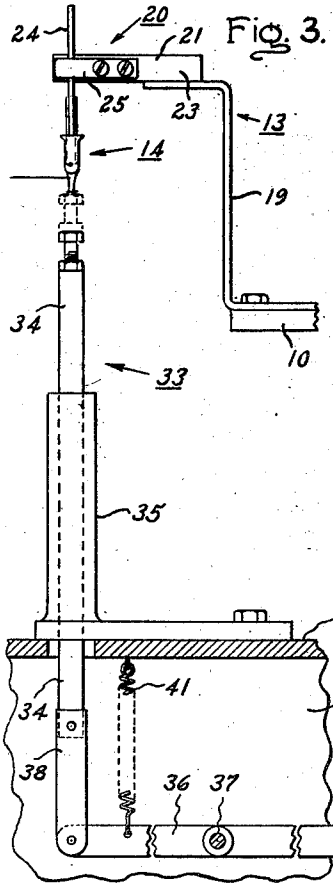


Fig. 4.

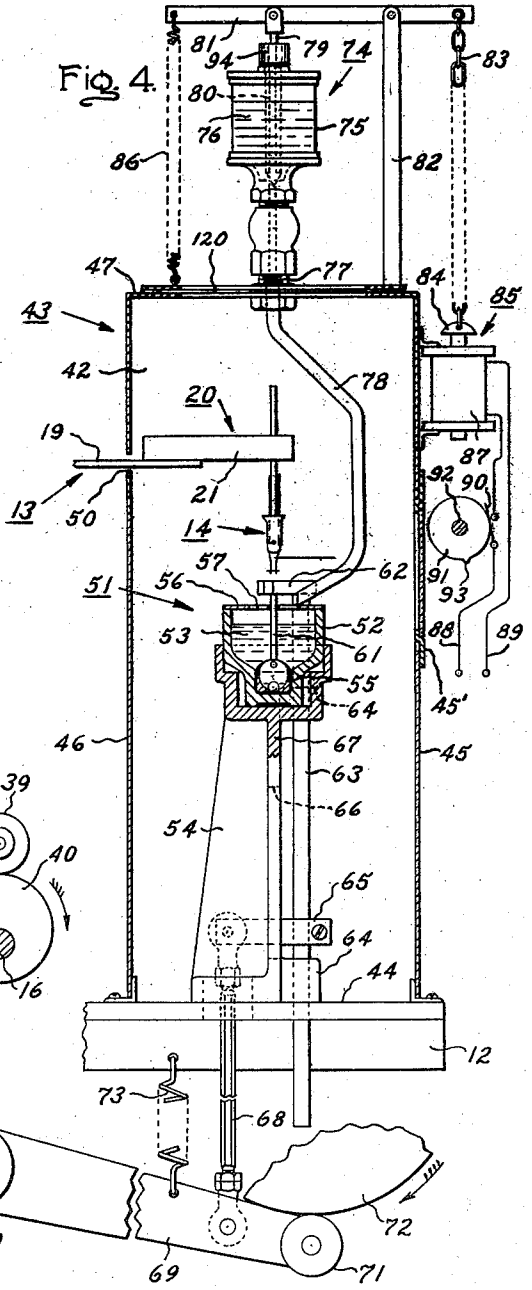
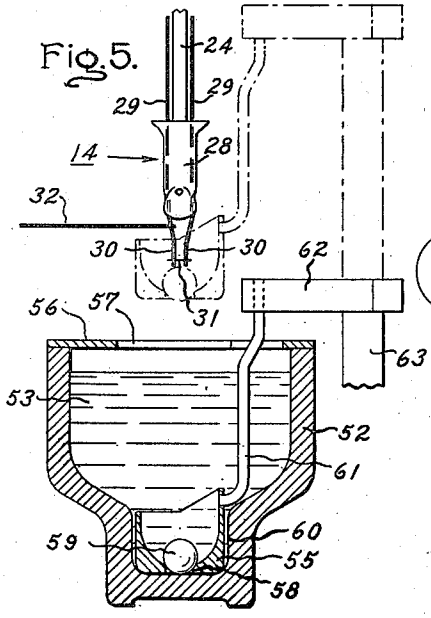


Fig. 5.



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Fig. 6.

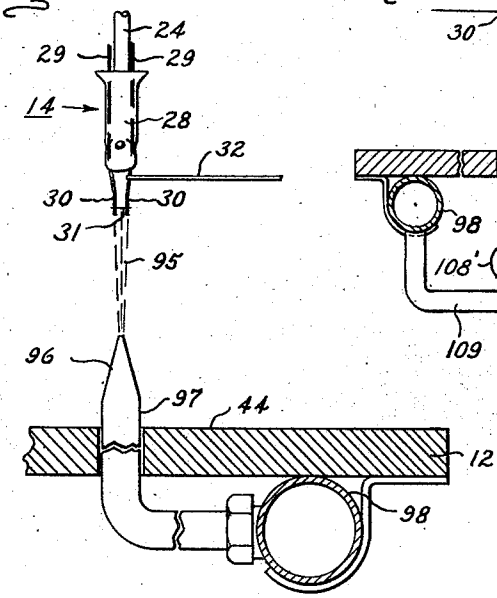


Fig. 8.

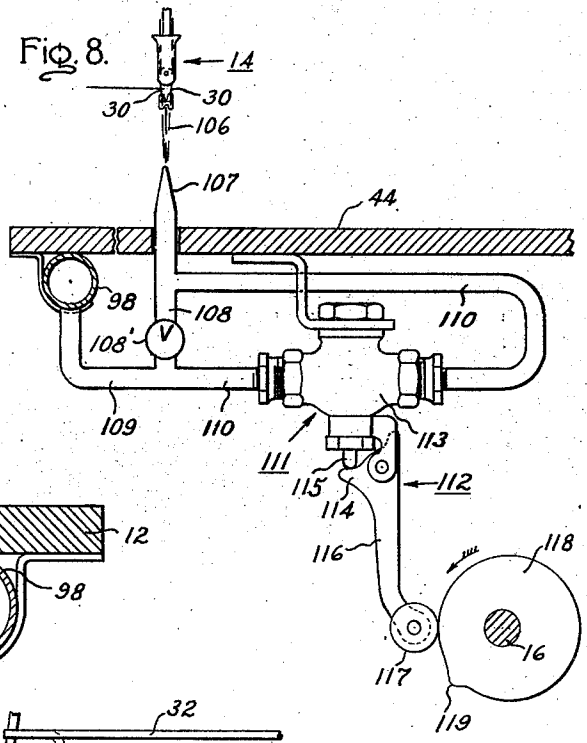


Fig. 9.

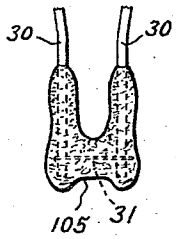


Fig. 10

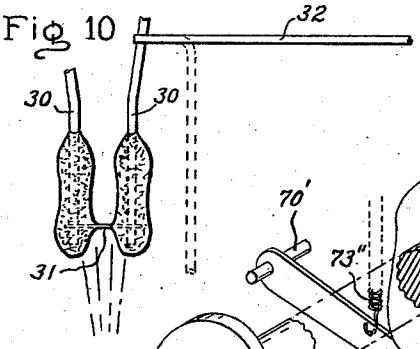


Fig. 7.

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Patented Sept. 21, 1948 2,449,648

UNITED STATES PATENT OFFICE

2,449,648

METHOD OF AND APPARATUS FOR MANUFACTURING FLASH LAMPS

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Application February 26, 1944, Serial No. 524,081

11 Claims. (Cl. 117—102)

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My invention relates in general to method and apparatus for producing photoflash lamp mounts, particularly for photoflash lamps of the type commercially known as the "Speed Midget" or "SM" and disclosed and claimed in U. S. Patent 2,291,983 to M. Pipkin. More particularly, my invention relates to method and apparatus for applying the fulminating material to the lead-in or support wires of such lamps.

In photoflash lamps of the above-mentioned "SM" type, the inner end portions of the lead-in wires are provided with a relatively heavy coating of fulminating or primer material which constitutes the sole actinic light-producing medium of the lamp. Such photoflash lamps depend almost entirely upon a uniform amount and distribution of the fulminating material on the lead-in wires to provide uniform quality lamp performance. The hand application of the fulminating material to the mount lead-in wires, besides being a slow and expensive process, is an extremely hazardous operation due to the highly explosive character of the fulminating material. In addition, such hand application of the fulminating material to the lamp mounts does not lend itself to the production of beads or coatings of uniform size and shape with the result that lamps of non-uniform flash performance characteristics are produced.

It is an object of the present invention, therefore, to provide novel apparatus for automatically producing uniform size and shape coatings of fulminating material on the mounts for photoflash lamps of the above-mentioned type.

Another object of the invention is to provide a novel method for producing uniform size and shape coatings of fulminating material on the mounts for such type photoflash lamps.

Further objects and advantages of my invention will appear from the following description of a species thereof and from the accompanying drawings in which:

Fig. 1 is a diagrammatic plan view of apparatus according to the invention; Fig. 2 is a fragmentary perspective view of one of the mount holders of the said apparatus with a mount shown in place therein; Fig. 3 is an elevation, partly in section, of the mount positioning mechanism at station D; Fig. 4 is a vertical section on the line 4—4 of Fig. 1; Fig. 5 is an enlarged fragmentary view of the mechanism shown in Fig. 4 for coating the mount, the primer-applying dipper being illustrated in a position 90° from its correct position for purposes of clarity; Fig. 6 is a vertical section, partly in elevation, on the line 6—6 of

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Fig. 1; Fig. 7 is a perspective view of the cam shaft and associated follower levers for actuating the primer-applying dippers at the various coating stations; Fig. 8 is a diagrammatic illustration of the air jet mechanism at station R; and Figs. 9 and 10 are enlarged views of the coated lower end portions of the mount immediately before and after it is subjected to the air blast at station R.

Referring to the drawing, the apparatus according to the invention comprises a turret or carrier member 10 rotatably mounted on a vertical shaft 11 journaled in the bed or base housing 12 of the machine. The turret supports, at regularly spaced points around the periphery thereof, a plurality (24) of heads 13 each arranged to support a lamp mount 14 in an inverted position. The turret 10 is intermittently indexed in a counterclockwise direction, as indicated by the arrow in Fig. 1, to advance the heads 13 in turn through the stations A to Y at which the various operations are performed. The indexing of the turret may be performed by any conventional indexing mechanism, such as by means of a rotating drum-type cam 15 mounted on a horizontal drive shaft 16 and engaging with a plurality of rollers 17 mounted around the periphery of a spider 18 fastened to the turret support shaft 11. Such an indexing mechanism is more fully described in U. S. Patent No. 1,742,153, Stiles et al.

Each head 13 comprises a bracket or arm 19 fastened to and extending radially outward from the periphery of the turret 10 and provided at its outer end with a holder 20 for supporting the lamp mount 14. The said holder 20 comprises a block 21 fastened to the outer end of the arm 19 and having a vertically extending, shallow, U or V-shaped groove 22 (Fig. 2) in one of its side faces 23 for receiving the exhaust tube 24 of the lamp mount 14. The mount is supported in the holder 20 by means of a plate spring 25 which is fastened to the block 21 and holds the exhaust tube 24 in place within the groove 22 while permitting vertical adjustment therein. To permit ready insertion of the exhaust tube 24 between the spring 25 and the side face 23 of the holder block 21, the outer ends of the spring 25 and block 21 are flared outwardly as indicated at 26 and 27, respectively.

The lamp mounts 14 each comprise a glass stem 28, an exhaust tube 24 sealed thereto and extending outwardly therefrom, a pair of lead-in wires 29 sealed through the stem and having substantially parallel inner lead portions 30, and a small linear filament 31 of tungsten connected to and

bridging the inner ends of the inner leads 30. A short length of wire 32 is connected to one of the inner leads 30 to serve as an antenna during the glow-testing of the finished photoflash lamp. In the particular mount 14 illustrated, the inner leads 30 are formed of wire approximately 20 mils in diameter and have their innermost end portions spaced apart to provide a gap of approximately 0.1 inch or so.

The lamp mounts 14 are inserted in the holders 20 by an operator at the loading stations A, B and C, the mounts being inserted in the holders in an inverted position, as shown in Fig. 2, with the inner leads 30 extending downwardly and the filament 31 extending radially of the turret. In loading the mounts 14 into the leads 13, the operator sets them in a position somewhat lower than their ultimate "priming" or coating position.

From the last loading station C, the heads are carried by the turret to station D where the mount 14 is set to a predetermined height or vertical position in the head by suitable positioning means 33 (Fig. 3) located at the said station. The said positioning means 33 comprises a vertically reciprocable push rod 34 which is disposed beneath and in vertical alignment with the mount at station D and is slidably mounted in a bracket 35 fastened to the bed 12 of the machine. The push rod 34 moves upwardly into abutting engagement with the tips or lower ends of the inner leads 30 and pushes the entire mount 14 upwardly in its holder to the said predetermined height as determined by the upper limit of upward movement of the push rod. The vertical reciprocating movement of the push rod 34 is produced by a horizontally extending lever 36 pivotally mounted intermediate its ends on a shaft 37 supported on the machine bed 12. One end of the lever 36 is pivotally connected to the lower end of the push rod 34 through a link 38 while the other end is provided with a roller 39 which engages a cam 40 on the drive shaft 16. The roller 39 is constantly held in engagement with the cam 40 by means of a spring 41 one end of which is connected to the machine bed 12 and the other end of which is connected to the lever 36. The cam 40 is so shaped and mounted on the shaft 16 as to rock the lever 36 and thus raise the push rod 34 to the proper mount-positioning height, as shown in dotted lines in Fig. 3, during the interval when the mount 14 is positioned at station D.

Following its positioning at station D, the mount 14 is carried by the head 13 through idle stations E, F, G and H. During its indexing movement from stations G to H, the mount and its holder 20 enter a chamber 42 (Fig. 4) formed by a hood 43 mounted on and fastened to the table portion 44 of the machine bed 12. The said hood 43 serves to protect the operator from injury in the event of an explosion of the primer material during the operation of the machine, and it extends from a point intermediate stations G and H to a point intermediate stations R and S, as shown in Fig. 1. The hood 43 comprises arcuate-shaped outer and inner side walls 45 and 46, respectively, a top or cover plate 47, and front and rear end walls 48 and 49, respectively. The front and rear end walls 48, 49 are provided with suitably shaped openings, conforming more or less closely in shape to the outline of the head and the mount carried thereby, to permit passage of the said head and associated mount through the said end walls. Likewise, the inner side wall 46 of the hood is suitably slotted, as indicated at 50 in Fig. 4, to provide a passageway for the head bracket 19 during the course of movement of the head through the hood.

From idle station H, the mount 14 is carried by the head 13 to station J where a first coating of primer or fulminating material is applied to the mount by suitable coating mechanism 51 located at the said station. The said coating mechanism 51 comprises a cup or jar 52 containing a supply of fluid primer material 53 and removably supported on a bracket 54 mounted on the table portion 44 of the machine bed. A cup-shaped dipper or applicator 55 is vertically reciprocable into and out of the cup 52 to carry a small quantity of the fluid primer material up around the lower end portions of the mount lead-in wires 30 and around the filament 31. The cup 52 is provided with a protective cover plate 56 having an aperture 57 for the passage of the dipper therethrough during its vertical reciprocating movement.

The dipper 55 is provided with an orifice 58 (Fig. 5) at the bottom thereof which is normally closed by a steel ball 59. During the downward movement of the dipper into the cup 52, the ball 59 lifts a slight amount off the rim of the orifice 58 to thereby permit flow of the primer material through the orifice and into the dipper. At the same time, the primer material in the cup 52 spills or flows over the rim of the descending dipper 55 to complete the filling thereof with the primer material. In order to use up substantially the entire quantity of primer material 53 within the cup 52 before a refilling or a replacement thereof with a filled cup is necessary, the cup 52 is provided with a small well 60 at the bottom thereof just large enough to accommodate the dipper 55 up to its full vertical extent. To enable the removal of the cup 52 from within the hood 43 for replacement with a filled cup or for refilling with additional primer material 53, the outer side wall 45 of the hood 43 is provided with a door or a removable cover 45' having a window through which the coating operations can be readily observed. The cups 52 are preferably made of a relatively inexpensive material, such as glass, and are preferably discarded, when all the fulminating material therein has been used up, to thereby eliminate the fire and explosion hazard which would attend the cleaning and refilling of the emptied cups.

The dipper 55 is supported by a vertically extending rod or wire handle 61 fastened at its upper end to a support arm 62 overhanging the cup 52. The support arm 62 is fastened to the upper end of a vertically extending push rod 63 which is vertically reciprocable in bearings 64 on the bracket 54. A cross arm 65, fastened at one end to the push rod 63, projects through a vertical slot 66 in the wall 67 of bracket 54 and is pivotally connected at its other end to the upper end of a vertical operating rod 68. The said operating rod 68 is in turn pivotally connected at its lower end to a lever 69 pivoted at one end on a shaft 70 supported on the machine bed 12. The other end of lever 69 is provided with a roller 71 which engages the periphery of an operating cam 72 mounted on the drive shaft 16. A spring 73 connected at one end to the bed 12 of the machine and at the other end to the lever 69, holds the roller 71 in constant engagement with the cam 72.

The cam 72 is so shaped and mounted on the shaft 16 as to raise the dipper 55 to its mount coating position (shown in dash-dot lines in

Fig. 5) during the interval when the mount 14 is positioned at the first coating station J. In the particular case illustrated, the dipper is raised by its operating mechanism to a height sufficient to immerse the inner leading-in wires 30 of the mount to a depth of from 5–7 mm. or thereabouts. On its ensuing down stroke, the dipper 55 is initially lowered at a uniform and relatively slow rate, at least until the inner leads 30 of the mount are completely withdrawn from the primer material in the dipper. This is done in order to insure against bridging of the primer material between the inner leads 30 and to produce individual and alike coatings on the said leads 30. The primer material 53 which is applied to the mount at the first dipping station J is of a relatively thin consistency, comparable to that of a syrup, so as to form only a very thin coating on the inner leads 30.

The primer material 53 applied to the mount may be of any suitable composition to provide the desired flash performance characteristics in the finished lamp. Thus, it may be any of the compositions set forth in the above-mentioned Pipkin Patent No. 2,291,983. Preferably, however, it is composed of an admixture of potassium perchlorate, sodium chlorate and zirconium (grade 3) powders, suspended in a binder or vehicle of nitrocellulose dissolved in a volatile solvent such as amyl acetate. The vertical reciprocating movement of the dipper 55 in the reservoir 53 of primer material keeps the latter well mixed and prevents the settling out of the heavier particles thereof. To further aid in preventing such settling out of the heavier particles, the cam 72 may be shaped to impart to the dipper 55 one or more vertical reciprocations of short stroke during the interval when the dipper is in its lowered position within the cup 52. Such additional reciprocating movement of the dipper thus produces a puddling action on the primer material 53 within the cup 52.

Because of the relatively quick-drying character of the preferred primer composition which is used, it has been found desirable to provide automatic viscosity control means 74 for maintaining the primer material 53 at the proper consistency. Referring to Fig. 4, the said viscosity control means 74 comprises a valved container 75, such as a standard drip oiler or oil cup, mounted on top the hood 43 at a point more or less above the cup 52 at station J and containing a supply 76 of amyl acetate or other diluent. The outlet 77 at the lower end of the container 75 projects through the top wall 47 of the hood 43 and is connected to a tube or conduit 78 which extends to a point just inward of the rim of the aperture 57 in the cover plate 56 on the cup 52 so that the diluent passing through the tube drops from the lower end thereof down through the cover plate aperture 57 and into the cup 52.

The stem 79 of the valve 80 in the container 75 projects out the top of the said container and is pivotally connected to a radially extending lever or rocker arm 81 which is pivotally mounted, at a point outwardly of its connection to the valve stem 79, on an upstanding bracket 82 mounted on the top 47 of the hood 43. The outer end of the rocker arm 81 projects outwardly beyond the outer side wall 45 of the hood and is connected by a chain or link 83 to the armature 84 of a solenoid 85 fastened to the outer side wall 45 of the hood. A spring 86, connected between the top 47 of the hood and the inner end of the rocker arm 81, maintains the container valve 80

closed when the solenoid 85 is deenergized. The coil 87 of the solenoid 85 is connected, through leads 88, 89, and a microswitch 90, to a suitable source of current supply. The microswitch 90 is periodically closed by a cam 91 mounted on a motor-driven shaft 92 which rotates at a constant speed. The cam 91 closes the switch 90 one or more times during each revolution of the cam, depending upon the number of switch operating nodes 93 on the cam. In the particular case illustrated, the cam 91 is provided with only one switch-closing node 93 and is rotated at a speed of approximately ⅔ R. P. M. The amount of thinner or diluent 76 released by the valve 80 may be adjusted by means of the adjustment nut 94 with which the valve is provided. Where the primer material employed is of the preferred composition set forth hereinabove, the valve 80 is adjusted to feed three drops of diluent to the cup 52 during each interval the valve is open, i. e., three drops every 90 seconds.

Following the application of the first coating of primer material to the mount at station J, the mount is carried by the head 13 to the next station K where a stream of air 95 (Fig. 6), from a nozzle 96 disposed directly underneath and in line with the mount at the said station, is directed against the coated portions of the mount to thereby promote the drying of the suspension or wet primer coatings on the inner leads 30. The nozzle 96 is preferably formed by a tube 97 the end of which is flattened to produce a narrow slit constituting the orifice of the nozzle. As shown in Fig. 6, the nozzle 96 is disposed with its flattened end extending transversely to the plane of the inner leads 30 of the mount so that the stream of compressed air 95 from the nozzle is directed substantially between the inner leads for the purpose of blowing or breaking apart any bridge of primer material that may have remained between the inner leads. The nozzle 96 is connected by the tube 97 to an arcuate-shaped manifold tube 98 mounted on the machine bed 12 and connected to a suitable supply of low pressure compressed air. If desired, the air from the nozzle 96 may be heated in any suitable manner to further promote the drying of the wet primer material on the mount leads 30.

From station K the mount 14 is carried by the head 13 to the next station L where a second coating of primer material is applied to the mount by coating mechanism 99 like that located at station J. The dipper 55′ of the coating mechanism 99 is reciprocated, as at station J, by a lever 100 (Figs. 1 and 7) pivoted at one end on the shaft 70 and pivotally connected at its other end to the dipper operating rod 68′. A cam 101, similar in shape to the cam 72, engages a roller 102 on the lever 100 to pivot the latter on its pivot shaft 70, the roller being held in constant engagement with the cam 101 by means of the spring 73′.

The primer material applied to the mount at station L is preferably of approximately the same consistency as that applied at the first coating station J, and it is maintained at the proper consistency by automatic viscosity control means 74 similar to that at station J. The cam (not shown) for closing the electrical circuit through the solenoid coil of the control device 74 at station L may be mounted on the same shaft 92 with the cam 91 for the control device 74 at station J.

By the time the mount reaches the second coating station L, the first coating applied at

station J has dried sufficiently to cause the deposit thereon of a second, thin layer of primer material upon withdrawal of the mount from the primer material in the dipper 55'. Following the application of this second coating, the mount is successively carried by the head 13 through stations M, N, O, and P where continuous streams of air 95, from nozzles 96 located at each of said stations, are directed against the coatings on the inner leads 30 to promote the drying or "setting" of the same. As before, the air so directed against the mount may be heated if desired.

At the next station Q, a third and final coating of primer material is applied to the mount by coating mechanism 103 of the same type as at stations J and L. The primer material applied at this third coating station, however, is of substantially heavier consistency than that of the primer material applied at the first two coating stations J and L, so that a relatively heavy or thick coating of primer material remains on the previously coated leads 30. As at stations J and L, the primer material applied at station Q is maintained at the proper consistency by an automatic viscosity control device 74 similar to that at stations J and L, the cam (not shown) for closing the electrical circuit through the solenoid coil of such control device at station Q being mounted on the same shaft 92 with the cams 91 for the control devices 74 at stations J and L. When the primer material applied at station Q is of the preferred composition previously referred to, the viscosity control device is so adjusted as to feed only one drop of diluent to the cup 52'' every 90 seconds.

The cam 104 for operating the dipper 55'' at station Q is so shaped as to raise the said dipper to its upper mount-coating position in the same manner as at the two previous coating stations J and L, but to lower it more rapidly than at the said previous stations so as to leave considerable primer material high up on the inner leads 30. At the instant the tips or lower ends of the inner leads 30 break the surface of the reservoir of primer material in the dipper 55'' during the down stroke of the latter, the dipper is again given a very slight upward movement of approximately 1 mm. or so to thereby reimmerse the leads 30 for a short distance of approximately 1 mm. or thereabouts. As soon as the dipper 55'' reaches the upper limit of its reimmersion movement, it is immediately lowered to withdraw the leads 30 from the primer material reservoir in the dipper, thus leaving a "bridge" 105 (Fig. 9) of wet primer material between the tips or lower ends of the leads 30. In addition, this reimmersion movement of the dipper 55'' at station Q tends to draw away the excess primer material which may have run down off the leads 30.

As soon as the dipper 55'' clears the head 13 and associated mount 14 during its return stroke down into the cup 52'', the turret 10 immediately indexes to carry the head to the next station R where a timed puff or blast of compressed air 106 (Fig. 3), from a nozzle 107 located directly underneath the mount, is immediately directed against the said mount (i. e., before the primer material has had a sufficient time to "set") to break the bridge 105 of "wet" primer material and lift or "roll" the same back up on the leads 30, thus leaving the filament 31 bare or devoid of primer material except possibly for a very fine deposit at some points therealong. The puff of air 106, which lasts for only a relatively short period of time such as a fraction (1/5) of a second or so, is immediately followed by a steady, mild or gentle stream of air from the nozzle 107 which then "sets" the wet primer material enough to prevent its running down the leads 30 and forming another bridge therebetween.

The nozzle 107 for producing both the timed air puff 106 and the subsequent steady stream of air at station R is similar to and is mounted in the same manner as the nozzles 96 at the previous air-drying stations, i. e., with its slit-shaped aperture disposed transversely of the plane of the inner leads 30 of the mount. The nozzle 107 is connected by a tube 108 to a compressed air line 109 extending from the air supply manifold 98. The tube 108 is provided with a valve 108' which is adjusted to reduce the pressure of the air flowing through the said tube to thereby produce only a gentle continuous stream of air from the nozzle 107. The said nozzle is also connected to the air line 109 through a second tube 110 which is normally closed by a valve 111 (Fig. 8) connected therein and opened by a bell-crank lever 112 pivoted on the valve housing 113. One arm 114 of the lever 112 engages the spring-closed pin 115 of the valve 111 while the other arm 116 of the lever 112 is provided with a roller 117 which engages a cam 118 mounted on the drive shaft 16. The cam 118 is provided with a lift 119 which pivots the lever 112 about its pivot point to move the valve pin 115 to its open position for a short interval to thereby produce the timed puff or blast of air 106 from the nozzle 107. When the valve 111 is subsequently closed, the continuous flow of air in the air line 108 then provides the continuous stream of air from the nozzle 107 for "setting" the primer material on the mount lead-in wires 30. Under certain atmospheric conditions, it has been found desirable to saturate the air fed to the nozzle 107 with amyl acetate to thereby insure the formation of smooth-surfaced beads or coatings on the mount lead-in wires 30. This may be conveniently done by suitably bubbling the air flowing in the line 109 through a pool of amyl acetate. If desired, the air fed to the other nozzles 96 may also be saturated with amyl acetate in like manner.

From station R the coated mount 14 is then carried by the head 13 to station S where another stream of air from a nozzle 96 located beneath the mount and connected to the air supply manifold 98 is directed against the mount to further promote the drying of the primer coatings thereon. The mount is subsequently carried through idle station T where the coatings on the leads 30 are further dried in the atmosphere, and thence to unloading stations U to Y where the coated mount is removed from the head 13. After its removal from the head the mount antenna wire 32 may be bent or shaped into its final position, as shown in dotted lines in Fig. 10, to thereby complete the manufacture of the mount.

If desired, the top wall 47 of the hood 43 may be provided with readily frangible pressure-relief membranes 120, such as Cellophane windows, located directly above each of the primer-containing cups at stations J, L, and Q. Upon the occurrence of any explosion within the hood at one or the other of the coating stations, the corresponding pressure-relief membrane will rupture to thereby divert the force of the explosion upwardly through the top of the hood and away from any person standing alongside the hood.

The hood 43 may be also provided with suitable humidity control means for heating and drying

the air within the hood when the humidity of the atmosphere is too high to permit proper "setting" of the wet primer material on the mounts and, therefore, proper operation of the machine. Such humidity control means may comprise a number of electric incandescent lamps mounted in the hood 43 within suitable housings for protecting the lamps from any explosions that may occur in the hood. The drying of the air in the hood may be also accomplished through the use of calcium chloride or other chemical drying agents disposed in pans within the hood.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. Apparatus for applying fulminating material to the inner leads of photoflash lamp mounts comprising a carrier having a head thereon for supporting the lamp mount, means for advancing said carrier to carry the head and associated mount through a plurality of stations, separate coating mechanisms located at two of said stations for applying to the mount successive coatings of a suspension of the fulminating material in a binder comprising a volatile solvent, means located intermediate the said two stations for directing a stream of air against the coating on the mount to promote drying of said coating, and means located adjacent the path of travel of said head from the last one of the said two stations and arranged to direct an air blast approximately longitudinally of and against the ends of the said leads to redistribute the fulminating material on said leads.

2. Apparatus for applying fulminating material to the inner leads of photoflash lamp mounts comprising a carrier having a head thereon for supporting the lamp mount, means for advancing said carrier to carry the head and associated mount through a plurality of stations, coating means at one of said stations for applying discrete coatings of a suspension of the fulminating material on the said inner leads, coating means at a subsequent station for depositing over the first coating another coating of fulminating material of sufficient thickness to bridge the said leads, and means at a subsequent station arranged to direct an air blast approximately longitudinally of and against the ends of the inner leads to sever the bridge of suspension material and redistribute it on the leads.

3. Apparatus for applying uniform discrete coatings of fulminating material to the inner leads of photoflash lamp mounts, said apparatus comprising a carrier having a plurality of heads thereon each comprising a holder for supporting the lamp mounts in an inverted position with the inner leads extending downwardly, means for advancing said carrier to carry the heads and associated mounts through a plurality of stations, means at one of said stations for positioning the mount in each of said heads in a predetermined vertical position in its holder, and separate coating means located at a plurality of subsequent stations for successively immersing the said inner leads to a predetermined depth in suspensions of the fulminating material to thereby coat the leads to a uniform extent.

4. In apparatus for coating the inner leads of photoflash lamp mounts with fulminating material, the combination of a cup containing a supply of the fulminating material in suspension, a holder for supporting the mount in an inverted position directly over the said cup, a dipper apertured at its bottom and vertically reciprocable into and out of said cup for carrying a quantity

of the suspension in said cup up around the inner leads of the mount, means for supporting and reciprocating the said dipper, said cup having a well at the bottom thereof just large and deep enough to accommodate the dipper when in its lowermost position in the cup, and valve means normally closing the aperture in said dipper and adapted to open during the downward movement of said dipper through the suspension in said cup to thereby permit flow of said suspension through the said aperture and into the dipper.

5. In apparatus for coating the inner leads of photoflash lamp mounts with fulminating material, the combination of a cup containing a supply of the fulminating material in suspension, a holder for supporting the mount in an inverted position directly over the said cup, a dipper vertically reciprocable into and out of said cup for carrying a quantity of the suspension in said cup up around the inner leads of the mount, and means for supporting and reciprocating the said dipper, said dipper having a small orifice at the bottom thereof normally closed by a metal ball resting on the upper rim of the said orifice.

6. In the manufacture of photoflash lamps, the method of providing discrete heavy coatings of a fulminating material on the end portions of closely spaced parallel metal wire supports which method comprises, immersing the said end portions of the supports in a liquid suspension of the fulminating material to form a heavy coating on the supports and a bridge of said material across the supports, and then directing a blast of air substantially longitudinally of and between said supports to sever the said bridge of suspension material and redistribute it on the said supports.

7. The method of providing the end portions of the inner leads of photoflash lamp mounts with discrete heavy coatings of a fulminating material which method comprises, immersing the said end portions of the leads in a relatively thin liquid suspension of the fulminating material to thereby form a light coating on each of said leads, drying the said light coating to at least partially set the same, then immersing the said end portions of the leads in a relatively thick liquid suspension of the fulminating material to thereby form a relatively heavy coating on the leads and a bridge of said thick suspension material across the leads, and then directing a blast of air substantially longitudinally of and between said leads to sever the said bridge of suspension material and redistribute it on the said leads.

8. The method of providing the end portions of the inner leads of photoflash lamp mounts with discrete heavy coatings of a fulminating material which method comprises, immersing the said end portions of the lead to a predetermined depth in a relatively thin liquid suspension of the fulminating material to thereby form a light coating on each of said leads, drying the said light coating to at least partially set the same, immersing the said end portions of the leads to substantially the same predetermined depth in a relatively thick liquid suspension of the fulminating material to thereby form a relatively heavy coating on the leads, immediately reimmersing the end portions of the leads to a lesser depth in said thick liquid suspension to form a bridge of suspension material between the leads, and then directing a blast of air substantially longitudinally of and between said leads to sever the said bridge of suspension material and redistribute it on the said leads.

9. Apparatus of the class described comprising the combination of means for supporting a photo-

flash lamp mount having closely spaced parallel lead wires extending therefrom, means for coating the ends of said lead wires with a suspension of fulminating material which forms a bridge therebetween, means arranged to direct a blast of air approximately longitudinally of and against the said ends of the lead wires to sever the said bridge and redistribute the coating material on said lead wires, and mechanism for effecting cooperation of the several means in proper sequence.

10. Apparatus of the class described comprising an applicator for a suspension of fulminating material, an air jet adjacent said container, support means for holding in alignment with said applicator a photoflash lamp mount having closely spaced parallel support wires extending therefrom, means to effect relative movement between said support means and said applicator to effect immersion of said support wires in the suspension in said applicator to coat said wires and form a bridge of the coating material between the wires, means for moving said support means to carry the mount held thereby to a position with its support wires in longitudinal alignment with said air jet, and means for supplying air to said jet at a pressure sufficient to sever the bridge of coating material and redistribute it on the support wires.

11. In the manufacture of photoflash lamps, the method of providing discrete heavy coatings of a fulminating material on the end portions of

closely spaced parallel metal wire supports having a filament bridging their said end portions which method comprises, immersing the said wire end portions and the filament in a liquid suspension of the fulminating material to form a heavy coating on the supports and a bridge of said material across the said supports and on the filament, and then directing a blast of air substantially longitudinally of and between said supports to sever the said bridge of suspension material and redistribute it on the said supports.

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