C. E. ALLEN.

AUTOMATIC AIR BRUSH MACHINE FOR COATING LAMPS, &c.

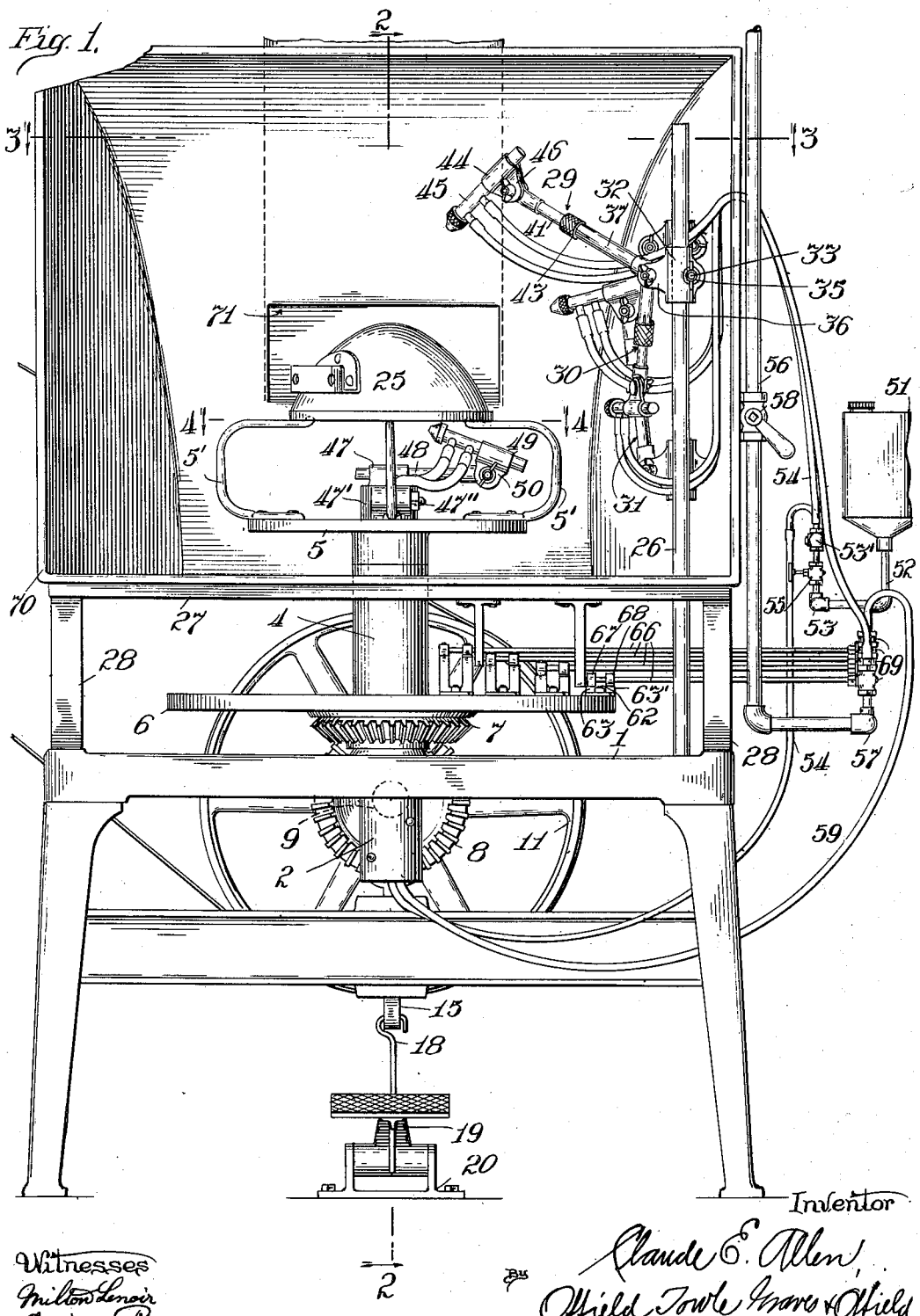
APPLICATION FILED JULY 25, 1917.

1,327,973.

Patented Jan. 13, 1920.

5 SHEETS—SHEET 1.

Fig. 1.



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Witnesses

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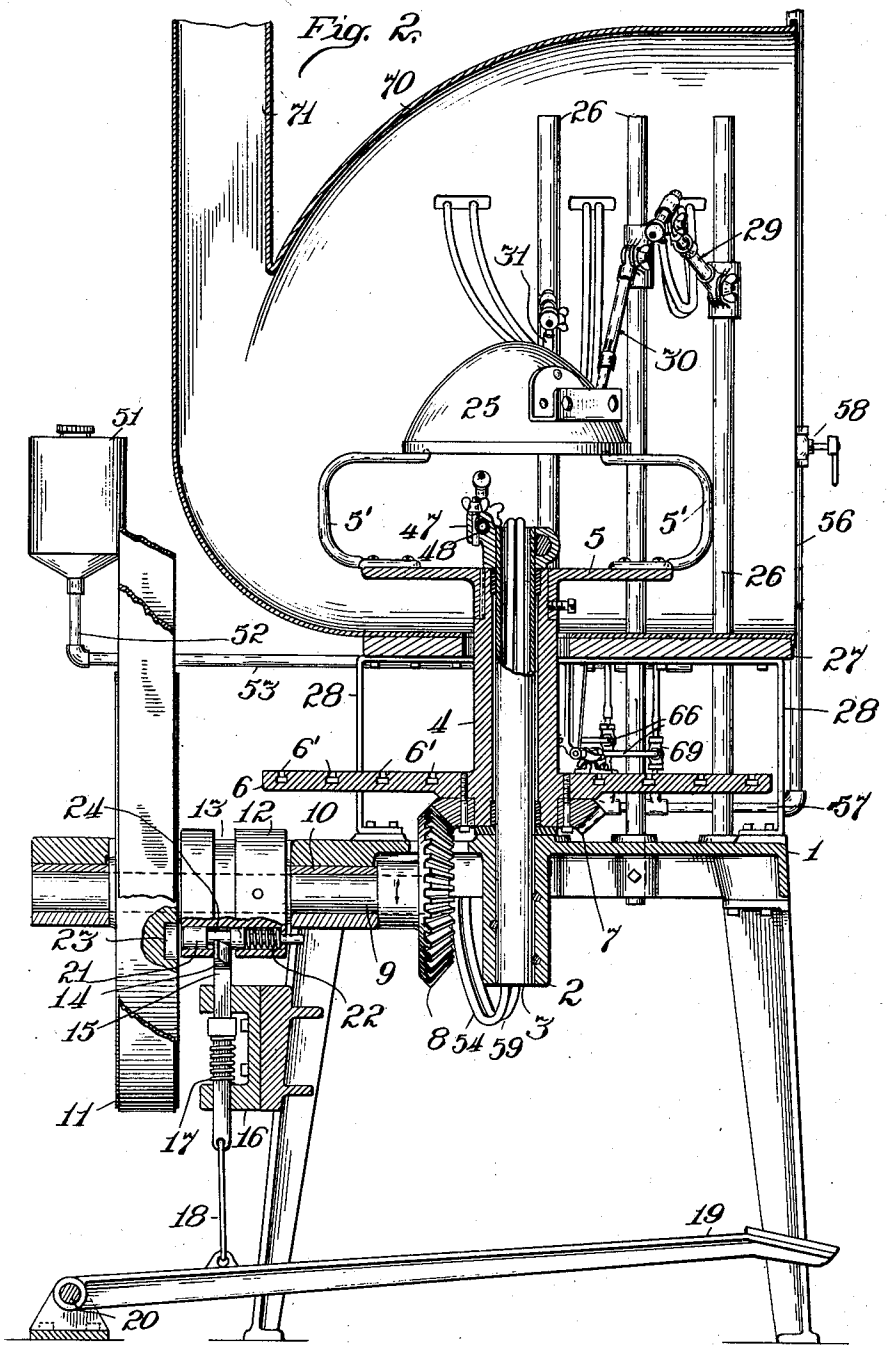
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5 SHEETS—SHEET 2.

Fig. 2.



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5 SHEETS—SHEET 3.

Fig. 3.

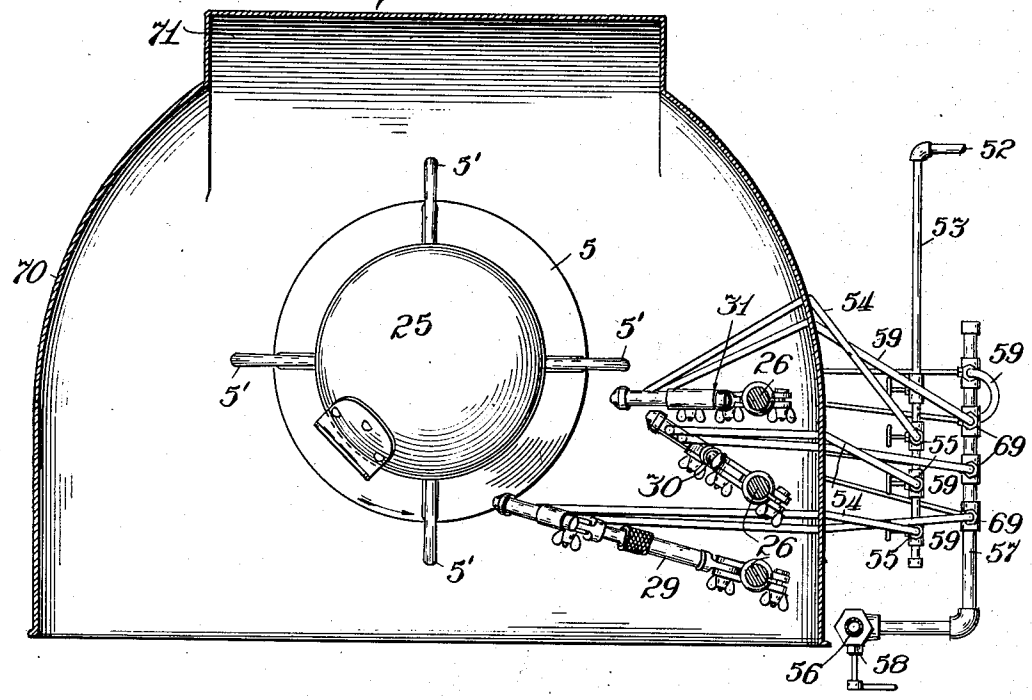
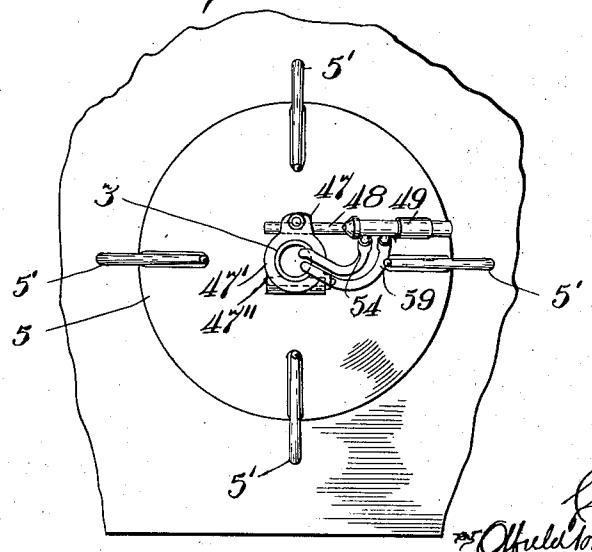


Fig. 4.



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5 SHEETS—SHEET 4.

Fig. 5.

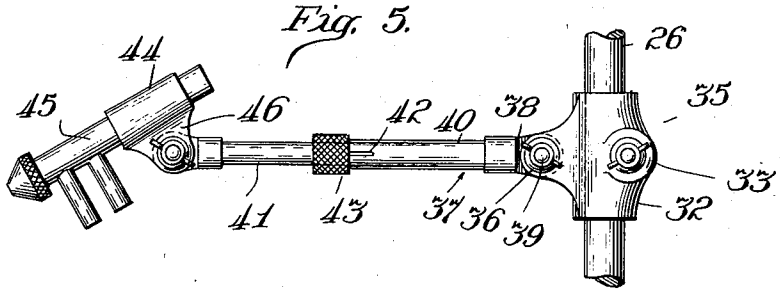


Fig. 6.

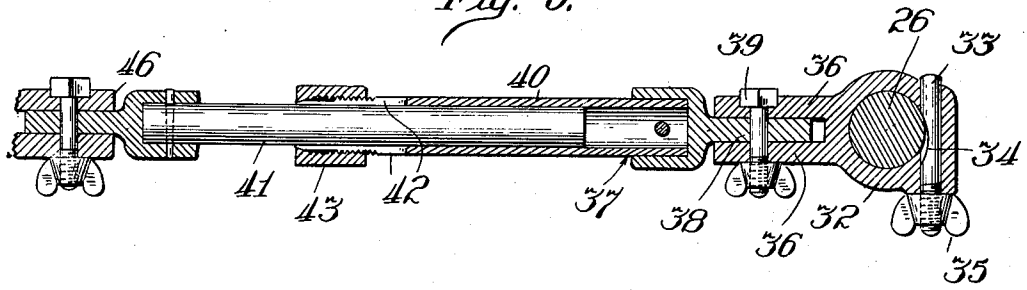
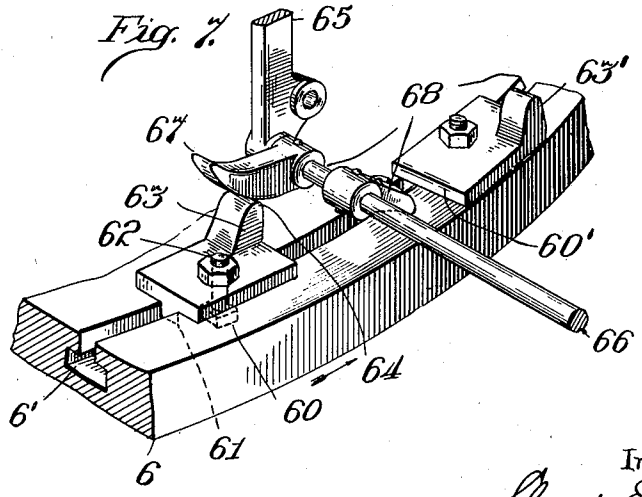


Fig. 7.



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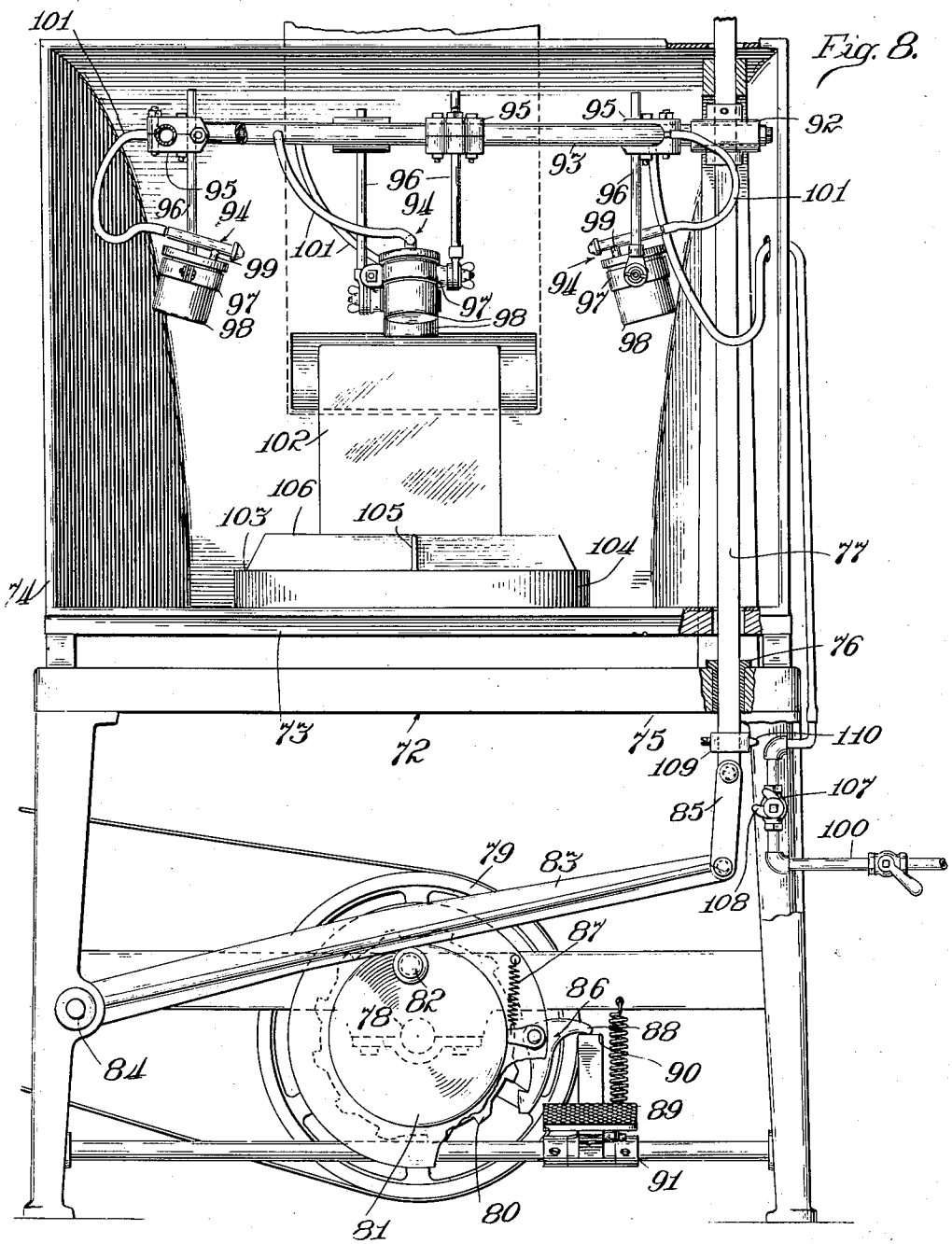
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5 SHEETS—SHEET 5.

Fig. 8.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC AIR-BRUSH MACHINE FOR COATING LAMPS, &c.

1,327,973. Specification of Letters Patent. Patented Jan. 13, 1920.

Application filed July 25, 1917. Serial No. 182,629.

To all whom it may concern:

Be it known that I, CLAUDE E. ALLEN, a citizen of the United States, residing at Kenosha, in the county of Kenosha and State of Wisconsin, have invented certain new and useful Improvements in Automatic Air-Brush Machines for Coating Lamps, &c., of which the following is a specification.

This invention relates to improvements in automatic air brush machines for coating lamps and the like, and its salient objects comprise the following:

To provide a machine which will automatically so manipulate the article to be coated and so control the air brushes that the entire operation of coating an article is automatic, except only the placing of the article in position upon, and removing it from, the machine; to provide a machine which is provided with a plurality of air brushes automatically brought into operation in such order as to insure coating all parts of the article which are to be coated, as these several parts are presented to the field of the several brushes, the operation of the brushes being automatically cut off at the proper time, so as to economize in coating material used; to provide a machine which is so organized as to enable it to be adjusted to treat headlight lamps or analogous articles of various shapes and configurations, the air brushes being to this end so mounted as to be capable of practically universal adjustments; to provide a machine which has a distinct cycle of movement, during which various air brushes are brought into, and cut out of, operation in properly timed relation, the machine being preferably a single revolution, or a single to-and-fro, cycle machine; to provide a machine which can be operated by the cheaper grades of unskilled labor, the operator's work consisting practically only of placing an article in position, operating a trip-treadle, and, after the coating has been effected, removing the article from the machine; to provide in a machine of the character in question adjustable means for automatically bringing any given air brush into operation during any desired part of a complete cycle of the machine; and in general, to provide an efficient, speedy, inexpensive and practical machine of the character referred to.

To the above ends the invention consists in the matters hereinafter described, and more particularly pointed out in the appended claims.

In the drawings—

Figure 1 is a front elevation of the machine, *i. e.*, a view looking at the machine as it is viewed by the operator;

Fig. 2 is a vertical sectional view practically through the center of the machine on the dotted line 2—2 of Fig. 1;

Fig. 3 is a horizontal sectional view taken on the dotted line 3—3 of Fig. 1 and looking downwardly; a lamp body being shown in position for treatment;

Fig. 4 is a plan view of the lamp-supporting mechanism and the under surface brush and connections; the lamp being removed from the supports;

Figs. 5, 6 and 7 are detail views of various parts of the machine;

Fig. 8 is a front elevation, with certain parts in section, of a modified form of machine.

The preferred form of machine shown in Figs. 1 to 7, inclusive, embodies a rotary support upon which the article to be coated is mounted, a series of air brushes supported in such manner as to be capable of being directed upon the article at any desired angle, mechanism for throwing the machine into operation to perform one cycle and automatically throwing it out of operation at the end of such cycle, and a fumes-withdrawing hood surrounding the article-support and spraying devices, except at the front.

Describing said machine, upon a suitable table-like standard frame, designated as a whole 1, there is rigidly mounted a centrally disposed downwardly depending rigid socket 2, within which is keyed and rigidly held an upright shaft 3. Upon the shaft 3, and bearing against the upper end of the socket 2, is rotatably mounted a revoluble pedestal member 4, carrying at its upper end a table-like member 5 and carrying near its lower end another table-like cam-support 6. Secured to the lower end of the member 4 is a bevel gear 7 which meshes with another bevel or miter gear 8 mounted upon a horizontal shaft 9 suitably journaled in bearings 10 secured to the bed plate. Upon the outer end of the shaft 9 is loosely

journaled a pulley wheel 11 which intermittently drives the shaft 9 and connected gearing through a treadle operated clutch mechanism now to be described.

On shaft 9 is rigidly mounted a collar 12 having a circumferential groove 13 within which lies a pointed cam 14 carried upon the upper end of a stem 15. Said stem 15 is mounted to extend through a suitable bracket support 16 carried by the main frame and is normally thrust upwardly to seat the cam in the groove by means of a coiled expansion spring 17. The lower end of the stem is connected by a link 18 with a foot treadle 19 pivoted at 20. The collar 12 is provided with a bore extending parallel with the axis of the collar and so located as to intersect the bottom of the groove 13. Within this bore is mounted a dogging bolt 21, which is impelled forwardly by means of a coiled spring 22 and the head of which is adapted to engage any one of a circumferential series of square-sided recesses 23 formed in the side face of the pulley 11. The dogging bolt is provided with a groove 24 intermediate its length and arranged to substantially register with the groove 13 of the collar 12; the bore within which the dogging bolt lies being so located that the radially outer part of the bottom of the groove 24 coincides with the bottom of the groove 13 in collar 12. When the machine is at rest the parts are in the position indicated in Fig. 2 of the drawings, the cam head 14 at such time lying within the groove 13 and at the same time engaging the groove 24 of the dogging bolt and holding it retracted. When the treadle is depressed and the cam withdrawn the dogging bolt springs forwardly into engagement with the side face of the pulley, engages the first recess 23 that comes by, thus throwing the machine into gear with the pulley to make a revolution.

While this revolution is taking place the treadle is released, the cam re-seats itself in the bottom of the groove 13, and as the dogging bolt comes around into engagement with the point of the cam, the latter retracts it, thus automatically throwing the machine out of gear at the end of a single revolution.

On the table 5 on the upper end of the pedestal 4 are mounted a plurality of arms 5′ which constitute supports upon which to rest the lamp body 25 or other article which is to be coated by the machine.

One or more brush-supporting standards are provided to carry the adjustable air brushes through which the coating material is delivered; there being three such supporting standards designated 26 in the machine now being described. The lower ends of these standards are seated on the bed plate of the machine, and they are supported intermediate their heights by passing through a supporting plate 27, which is in turn mounted upon skeleton rectangular frames 28 likewise mounted upon the bed plate.

These standards carry jointed brush-supporting arms 29, 30, 31, which may be, and as shown are, substantially alike.

Describing one of these, and referring now to Figs. 1, 5 and 6, a sleeve casting 32 is mounted to slide upon its corresponding standard 26, and is adjustably secured thereon by means of a through-bolt 33 extended through and movable within the casting in such relation to the bore thereof that the side body of the bolt intersects and slightly enters said bore. That part of the side of the through-bolt which registers with the bore is cut away in concave form, as indicated at 34, so that when the bolt is drawn up by means of its wing nut 35 the side body of the standard will be engaged thereby and the support 32 locked in position. The sleeve casting is also provided with a pair of clamping ears 36, between which is interposed and adjustably clamped the flattened end 38 of an arm 37; a clamping bolt 39 being extended through these parts for this purpose. Arm 37 is of two part construction, comprising a tubular outer part 40 and an inner rod-like part 41 which telescopes within said outer part. The end of part 40 is split, as indicated at 42, and a threaded sleeve 43 mounted upon the end of the split portion and having a threaded and tapered interior serves to compress the divided end of the part 40 and clamp it upon the part 41. Pivotally mounted upon the free end of the arm 37 is a second sleeve casting 44, in the barrel of which is supported the tubular body of an air brush, designated as a whole 45. The connection between the arm 37 and casting 44, designated generally as 46, is substantially like that at the opposite end of the arm, and requires no further description. It will be noted that the brush-supporting arm as a whole is adjustable both vertically and rotatably upon the standard 26; that the angle of the arm relatively to the standard is adjustable by the pivot joint between sleeve casting 32 and the arm proper; that the air brush is adjustable angularly relatively to arm 37 by means of the joint 46, and that the outer end of arm 37 is rotatably adjustable upon its own axis by means of the clamping sleeve connection 43. The several adjustments afford practically universal adjustment of the air brush. By reference to Fig. 3 it will be noted that the standards are arranged at such intervals apart that the adjustment of the several air brushes on their standards may be made without interference with each other, and so as to direct the air brushes at various angles toward the lamp body or other article to be coated.

An air brush is provided for coating the

under side of the article treated. To this end a horizontally disposed socket member 47 (see Figs. 1 and 4) is mounted upon the upper end of the supporting shaft 3 (see Fig. 2), and in this socket is adjustably secured an arm 48. The air brush 49 is mounted upon the end of this arm by means of a sleeve casting 50 like the sleeve casting 44 hereinbefore described. The member of which the socket 47 forms a part desirably takes the form of a split collar casting 47′ adjustably clamped upon the upper end of the shaft 3 by means of a through bolt 47″. This permits of rotative adjustment of said collar and the air brush carried thereby, and this fact, taken in connection with the other described adjustments, renders the air brush universally adjustable.

The air brushes proper may be of any well known or suitable construction, those shown being of a well known type and forming no part *per se* of the present invention.

The necessary supplies of air and enamel, or other coating liquid, are as follows: 51 designates an elevated tank in which is contained the coating liquid. Pipe 52 leads from this tank downwardly to and connects with a header pipe 53 (see Fig. 3). Flexible pipes 54 lead from the header 53 to each of the several air brushes, as indicated clearly in the drawings; the supply to each air brush being controlled by a turncock 55. One of the pipes 54 leads downwardly from the header to the lower end of the hollow shaft 3, thence up through the latter and to the air brush, as shown clearly in Figs. 2 and 4. A check valve is interposed to prevent the back flow of material in each of these supply pipes, as indicated at 53′.

56 designates an air supply pipe communicating with a source of air under pressure, which pipe leads downwardly to and connects with a horizontal header 57. A turncock 58 controls the flow of air through pipe 56. From the header 57 flexible air pipes 59 lead to each of the several air brushes, as shown clearly in the drawings; one of these pipes leading through the hollow shaft 3, as does the liquid supply pipe.

The flow of air through these several supply pipes 59 is automatically controlled in a manner now to be described. The table-like cam support 6 hereinbefore referred to is provided with a plurality of concentric spaced apart under-cut grooves 6′, utilized to secure cam trips to the cam-support in properly adjusted relation. Referring to Fig. 7, each cam trip takes the form of a casting 60 provided upon its under side with a guide rib 61 adapted to fit within the corresponding groove 6′ of the cam-support, a clamping bolt 62, the head end of which fits within the undercut part of the groove 6′ and enables the casting to be fixed in adjusted position, and an upstanding cam projection 63 having a rounded cam end 64. Upon a suitable support 65, depending from the frame 28, there is mounted a valve rod 66, upon which in turn is fixed a cam wing 67 adapted to coöperate with the corresponding fixed cam projection 63. The valve rod 66 also carries a second cam wing 68 adapted to coöperate with another adjustable cam member 60′, substantially like the member 60 just described, but spaced away from the latter, secured in the same cam groove 6′ and having its cam projection 63′ in circumferential alinement with the cam wing 68. The opposite end of cam rod 66 is operatively connected with the stem of a turncock 69 arranged in the header pipe 57 to control the flow of coating liquid through the corresponding supply pipe 59. Each of the four supply pipes 59 is controlled by a corresponding turncock, valve rod, and set of cam mechanisms like those just described. It follows that by properly adjusting the valve actuating cam castings circumferentially upon the cam supporting table 6, the timing of the operation of the brushes may be arranged as desired, it being understood that as the cam supporting table rotates each of its cam projections 63 will oscillate the corresponding cam rod to open the turncock controlling that particular supply pipe, and in the further rotation of the table the cam projection 63′ will encounter the other cam wing of the same valve rod and close the turncock.

Very often the coating material produces an objectionable vapor when sprayed through the air brushes, and accordingly the machine is shown as inclosed in a hood 70, open at its front side and provided at its back end with a chimney 71 through which the fumes are drawn away. This hood is conveniently mounted on the same support 27 which holds the standards 26 in upright position, as shown clearly in Fig. 2.

The operation of the machine has been substantially described in connection with the description of the mechanism, and need not therefore be repeated. It is to be observed, however, that the machine operates in conformity with the stated objects of invention and fully secures these stated objects and ends.

Describing now the modified machine shown in Fig. 8, this machine is more particularly designed for coating rectangular or analogous shaped articles, which would be unevenly coated by mounting them upon a rotatable support and rotating them through the field of operation of air brushes at a uniform speed. The machine now to be described has a stationary support for the articles to be treated; the air brushes are distributed around said article so as to act upon it from different angles, and the air brushes are bodily reciprocated up and down

while in operation so as to completely coat the article in one complete up and down cycle of the machine.

Upon a suitable table-like supporting frame, designated as a whole 72, is mounted a base plate 73 and upon the latter a hood 74. In the bed plate 75 of the main frame is provided a bearing 76 within which is supported a standard 77 susceptible of a limited vertical reciprocation through its bearing 76. To impart vertical movement to the standard 77, upon a shaft 78 there is loosely mounted a drive pulley 79, and adjacent said pulley a ratchet wheel 80, made fast to rotate with the pulley. Adjacent the ratchet wheel and fast to the shaft is a cam wheel or disk 81 carrying a cam stud 82 which is adapted to oscillate a lever 83 pivoted at one end, as at 84, to the main frame, and at its swinging end connected by a link 85 with the lower end of standard 77. Upon the cam disk 81 is pivotally mounted a dogging latch 86 which is acted upon by a spring 87 tending to throw it into engagement with the ratchet 80 which it overhangs. The said latch is provided with a tail extension 88 which projects radially outwardly into the path of the end 90 of a treadle trip lever 89. Lever 89 is pivotally mounted upon the cross rod, as indicated at 91, and its free end upturned in such manner that when the treadle is depressed the dogging latch is released by the oscillation of the treadle lever, whereupon its spring throws it into engagement with the constantly running ratchet wheel and the cam disk is rotated one revolution. As the dogging latch comes around in the completion of the revolution its tail piece engages the end of the treadle lever which has meantime been permitted to return to normal, the dogging latch is oscillated out of engagement with the ratchet wheel, and the machine arrested until the treadle lever is again depressed.

Upon the standard 77 there is adjustably mounted a ring 93 adapted to in turn support a plurality of air brushes 94. Each brush is supported by an adjustable clamp 95 mounted on the ring 93 and in turn supporting an arm 96 which carries at its end a clamping ring 97 embracing a liquid-pot 98 which supplies liquid to the air brush proper. Clamping rings 97 are adjustable on the arms 96; clamps 95 are adjustable on the pipe 93, and arms 96 are rotatably adjustable in said clamps. The body of each air brush is supplied with paint from its pot through an entraining tube 99. To supply the several brushes with air, the ring frame 93 is utilized as an air header, is supplied with air from a supply pipe 100 connected with a suitable source of air supply, and each air brush is connected with the ring frame by a suitable flexible pipe 101.

To support the receptacle 102 which is to be coated in proper relation to the several brushes, a skeleton block 103 is provided, which rests upon the floor of the hood, this skeleton block desirably consisting of a ring base 104 upon which is mounted a pair of crossed webs or ribs 105, 106.

To provide for automatically turning on and turning off the air brushes, a turncock 107 is interposed in the supply pipe 100, upon the stem of the turncock is fixed a double wing cam 108, and upon the reciprocating standard 77 is adjustably fixed a collar 109 carrying a cam projection 110 adapted to coöperate with the wings of the cam 108.

The operation of the machine is briefly as follows:

An article having been placed in proper position upon the support 103, and the air brushes having been adjusted in proper angular relation thereto, the operator depresses the trip treadle and the machine starts, the actuating lever 83 descending during the first half of the cycle and rising during the last. As the standard 77 descends, carrying with it the group of air brushes, its collar 109 strikes the cam 108, opens the air supply, and thus turns on the brushes. The brushes continue to spray the article during their descending movement and rising movement until the cam projection 110 encounters the upper wing of 108 and turns off the air. The machine automatically stops at the end of each revolution by reason of the tripping of the latch dog 86, in the manner hereinbefore described.

It is to be understood that the details of construction and arrangement of a machine embodying my invention are susceptible of wide variation, and this without departing from the invention. I do not therefore wish to be limited in the interpretation of the claims, except in so far as said claims are specific in terms or as required to differentiate from the prior art.

I claim as my invention:

1. In a machine of the character described, the combination of a suitable main frame, a rotatable article-support and means for rotating the same, a plurality of standards arranged in proximity to said article-support, a jointed and adjustable arm mounted upon each standard, air brushes carried by the several arms, a flexible supply pipe leading to each air brush, a valve controlling each supply pipe, a valve rod operatively connected with each valve, a rotatable cam support and circumferentially adjustable cams carried by said cam-support and adapted to coöperate with said valve rods to automatically open and close the valves at pre-determined intervals.

2. In a machine of the character described, the combination with a constantly running rotating drive member, of an arti-

cle-support, coating means, means for effecting relative movement of the article and said coating means, clutch mechanism for optionally starting and automatically arresting said relative movement after a predetermined cycle thereof, and means for automatically rendering said coating means effective during said cycle of movement.

3. In a machine of the class described, the combination of a constantly rotating drive member, a rotary article-support, coating means, means independent of said support for holding said coating means operatively adjacent to the article on said support, a trippable clutch for optionally connecting said article-support with said constantly running member and for automatically disconnecting the same after a predetermined cycle of movement of said article-support, and valve mechanism automatically controlled by the movement of said article-support for automatically rendering said coating means effective during the movement of said article-support, and subsequently inoperative at a later stage in said movement.

4. In a machine of the class described, the combination of a constantly rotating drive member, a rotary article-support, coating means, means independent of said support for holding said coating means operatively adjacent to the article on said support, a trippable clutch for optionally connecting said article-support with said constantly running member and for automatically disconnecting the same after a predetermined cycle of movement of said article-support, and valve mechanism automatically controlled by the movement of said article-support for automatically rendering said coating means operative during the movement of said article-support and subsequently inoperative at a later stage of said movement, said last-named means including independently adjustable starting and stopping parts for changing the period of effective operation of said coating means.

5. In a machine of the class described, the combination of a constantly rotating drive member, a rotary article-support, coating means, means independent of said support for holding said coating means operatively adjacent to the article on said support, a trippable clutch for optionally connecting said article-support with said constantly running member and for automatically disconnecting the same after a predetermined cycle of movement of said article-support, and valve mechanism automatically controlled by the movement of said article-support for automatically rendering said coating means effective during the movement of said article-support and subsequently inoperative at a later stage in said movement, said last-named means including a starting cam and a stopping cam carried by and independently adjustable upon said article-support, whereby the portion of the cycle of movement of said article-support during which said coating means is effective may be lengthened or shortened.

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