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A. T. ANDERSON

2,362,457

COATING MACHINE

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Fig. 1 -

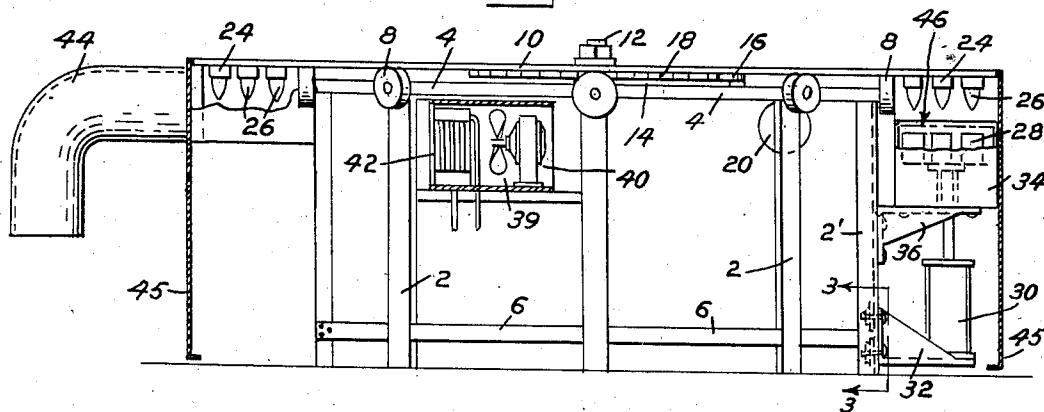


Fig. 2 -

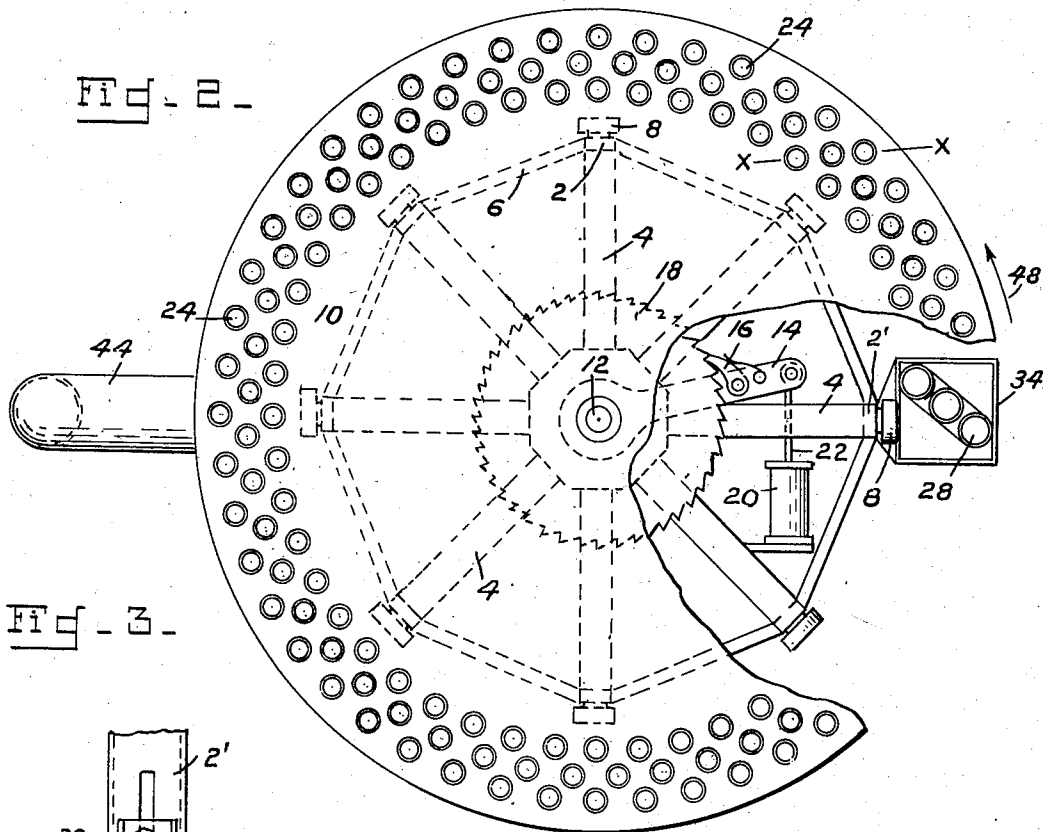
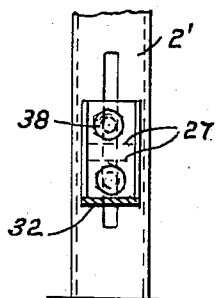


Fig. 3 -



Inventor

Andrew T. Anderson

By G. J. Kessenich of J. H. Church

Attorneys

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COATING MACHINE

Andrew T. Anderson, Dover, N. J.

Application July 16, 1942, Serial No. 451,191

1 Claim. (Cl. 91—46)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to a machine for applying protective or identifying coatings to articles of manufacture, particularly to ammunition components.

Many articles of manufacture, such as components of ammunition, require protective coatings for their preservation against destructive agencies which they may contact. An example is the oxidizing effect of the atmosphere on most materials of construction. In addition, however, it is often necessary or desirable to provide certain articles, such as ammunition, with coatings of specified coloring for identification purposes. It is of course desirable that such coatings be applied as economically as possible and that the results on the individual articles be substantially uniform.

It is an object of this invention to provide a machine which coats ammunition components with a minimum of handling by human operators, and which applies the coating to any predetermined length of the components. The ammunition is placed into openings in a rotatable table or support and suspends from the underside of the support. A container filled with a coat-forming substance is adapted to rise to permit at least one of the suspended components to dip into the substance. Intermittent rotation of the support moves the components into position in turn for dipping into the coat-forming substance. An overflow device insures that the liquid level in the container remains substantially constant, so that the various components will be dipped to the same depth. The height to which the container rises may be adjusted for varying coating requirements. Means may be provided to expedite drying of the coatings, such as a fan to blow heated air past the freshly coated components.

The specific nature of the invention as well as other objects and advantages thereof will clearly appear from a description of a preferred embodiment as shown in the accompanying drawing in which:

Fig. 1 of the drawing shows a machine built according to the invention, with parts broken away and in section to show details.

Fig. 2 is a top plan view, also with parts broken away.

Fig. 3 is an enlarged view in section on line 3—3 of Fig. 1.

Referring to the drawing in detail, a frame is

shown comprising uprights 2, radial arms 4, and braces 6. At the ends of arms 4 are mounted rollers 8 in such a manner that the surfaces of the rollers are substantially tangent to a common horizontal plane, which may be considered to be the under side of support table 10. Table 10 is rotatable about short shaft 12, and turns on rollers 8. Also supported on shaft 12 is an arm 14, carrying a pawl 16 which cooperates with a ratchet wheel 18 secured to the underside of table 10. An actuating member 20 is pivotally mounted on one of arms 4 and is connected to pivoted arm 14 by rod 22. Member 20 may be any of a number of suitable actuators, such as a hydraulic or pneumatic cylinder, electric solenoid, or the like. Member 20 may be fluid or electrically operated both on its working stroke and its return stroke, or it may be spring biased in one direction if desired.

As can be seen in Fig. 2, table 10 is substantially circular in contour. Near its periphery, the table is perforated, and the perforations or holes may be arranged in one or more concentric circles, as shown. The holes in the several circles are preferably aligned in rows as shown by the axis X—X drawn through one of these rows. The holes are fitted with bushings or adapters 24 to receive the ammunition components 26, or any other articles of manufacture. Articles 26 are thus suspended from table 10 by adapters 24, as shown in Fig. 1. If it ever be desired to use the machine for articles of a new size or shape, adapters 24 may be replaced by others to fit the new articles.

Disposed beneath table 10 at any selected point on the frame is a container or a plurality of containers 28 open at the top for a coat-forming substance, such as paint, with which the suspended articles are to be coated. Mechanism to provide relative movement of the containers and the table toward and from each other is indicated by actuator 30 mounted on bracket 32 and supporting the container or containers as shown. In order that the liquid in containers 28 may remain at a predetermined level to insure uniformity of coating or dipping among the articles, a suitable overflow means is preferably provided. In the embodiment shown, the said means consists of a reservoir 34 supported on bracket 36. This reservoir is adapted to hold a sufficient quantity of the coat-forming substance to keep the container or containers 28 submerged when actuator 30 is at the lower limit of its stroke. As discussed above in connection with actuator 20, the means for actuating member 30 may be fluid

pressure or electrical, or any other suitable means.

Means will preferably be provided to enable adjustment of the height to which container 28 may be raised to permit regulation of the depth to which articles 26 are dipped. These means may consist of the slotted upright 2' (Fig. 3) and clamping plates 27. Bolts 38 extend through the slot to clamp upright 2' between plates 27 and bracket 32. The slot in member 2' permits limited vertical adjustment of bracket 32. If desired, similar adjustment may be provided for bracket 36 carrying reservoir 34.

If desired, means may be provided to expedite drying of the coating on the freshly coated articles, in the form of fan 39 driven by motor 40 to force air past the freshly coated articles. A heater 42, such as the steam coils shown, is preferably provided to furnish heated air to still further facilitate drying. The exhaust air leaving duct 44 may be withdrawn into any suitable ventilating system.

If desired, an apron or housing 45 may be provided to shield the coated articles against dust, or to protect passing personnel from contact with the freshly coated articles.

Operation.—Starting with the parts occupying the relative positions shown in Fig. 1, it is seen that containers 28 are below the level 46 of the coat forming substance in reservoir 34. Containers 28 are raised by actuator 30 above this level 46. As the containers rise above this level, they are themselves filled to the rim with liquid; the containers continue to rise until articles 26 dip into the liquid a predetermined distance. Since the liquid in the containers was at rim level before the articles are dipped into it, the increase in volume due to articles 26 dipping into the liquid does not raise the liquid level, but merely causes overflow back into reservoir 34 of the displaced liquid. Thus the height to which the liquid level rises remains at a constant maximum for each operation.

It should be noted that containers 28 are aligned with each aligned row of holes in support 10 as that row rotates into dipping position. The angle which this row makes with a radius is not critical, but may be varied to suit the circumstances.

After actuator 30 has reached the end of its working stroke, corresponding to the maximum height to which the liquid level rises, it returns containers 28 to their submersed position. Actuator 20 thereupon pivots arm 14 about shaft 12; pawl 16 engages ratchet wheel 18, so that support 10 rotates through a small angle in the direction indicated by arrow 48. This moves the next row of aligned openings into position for dipping into the coat-forming substance as outlined above. Actuator 20 then returns arm 14 to its starting position. During this return movement of arm 14, pawl 16 springs away from the teeth of wheel 18, leaving the wheel and support 10 where they are.

Actuators 20 and 30 are synchronized at the primary energy source so that the rotary movement of support 10 is arrested—i. e., the support is not in motion—when containers 28 rise for the dipping operation.

At some convenient point along the periphery of the frame, the freshly coated articles pass through the drying station, at which heated air is circulated past the articles as explained above. The dried articles may then be removed and replaced by uncoated articles.

I claim:

In a machine for coating articles, in combination, a table provided with means for suspending a plurality of said articles and means mounting the table for rotation about a vertical axis, a container for a coat-forming substance non-rotatively disposed beneath the table, the said container being adapted to accommodate the suspended articles in a predetermined portion of the table, means to effect relative rotary movement between the table and container to bring the suspended articles and said container in cooperating relation, means to effect a relative vertical movement between the table and container to dip the suspended articles in the coat-forming substance of the container, said table being provided with openings to hold the articles, and further provided with bushings received in said opening adapted to the particular size of said articles.

ANDREW T. ANDERSON.