This invention relates to that type of machine which applies paint or other liquid coating machines, the present invention being a coating machine wherein the coating material is applied by means of a coating material through which the articles to be coated or processed are passed.

It will be apparent that with the use of the above mentioned type of machine, it occasionally becomes necessary to clean the machine and to perform maintenance work thereon. In some cases it may be necessary to change the type of coating when coating different types of articles or applying different coatings on the same article. Such cleaning, maintenance and/or changing of the coating material is a very time-consuming and costly procedure. Therefore, from these and other reasons it was necessary to develop a machine down with consequent costly interruption of production.

Thus, one of the principal objects of this invention is to provide a curtain coating machine wherein cleaning, maintenance, and/or changing of the coating material is very time-consuming and costly procedure. Therefore, from these and other reasons it was necessary to develop a machine down with consequent costly interruption of production.

A further object is to provide means for supporting the coating heads that are easily and accurately movable into the position for production or the off-line position, and are securely held in such positions.

A further object is to provide means for draining the coating material when in the off-line position.

A further object is generally to improve the design and construction of curtain coating machines.

The means by which the foregoing and other objects of the present invention are accomplished and the manner of their accomplishment will be readily understood from the following specification upon reference to the accompanying drawings, in which:

FIG. 1 is a side elevational view of the machine of the present invention.

FIG. 2 is a top plan view thereof.

FIG. 3 is a diagrammatic view showing the operation of a pressure curtain coating machine.

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FIG. 2 is a top plan view thereof.

FIG. 3 is a diagrammatic view showing the operation of a pressure curtain coating machine.
same side of base 13 as post 57. Additionally, framework 53 includes overhead members 77, 79, 83, 85 and 87 fixedly attached adjacent the upper ends of the posts in the following arrangement. Member 77 extends between posts 55 and 73, member 79 extends between posts 57 and 75, member 83 extends between posts 55 and 75, member 85 extends between posts 87 and 73, and member 87 extends between posts 55 and 57. Thus, members 77, 79, 83 and 85 form substantially a parallelogram when viewed from above, as in FIG. 2, and member 87 extends transversely across and above base 13 between two opposite angles of the parallelogram. The members 83 and 85 extend in parallel relationship diagonally across base 13, and the members 77 and 79 extend in parallel relationship longitudinally of the base on opposite sides thereof.

One end of one of heads 23 is pivotally supported from post 55 by means of an arm 89 which comprises a sleeve 91 rotatably disposed around the post and a horizontal pipe 93 fixedly attached adjacent one end to sleeve 91 and fixedly attached adjacent the opposite end to the head 23. A ring 95 is fixedly and adjustably attached on post 55 below sleeve 91 to support the sleeve. Thus, this head 23 is pivotally mounted for pivot about a vertical axis that coincides with the center line of this opposite end of this head 23 from arm 89 is provided a suitable clamp 97 which is removably engaged on post 73. A trough 99 is disposed between this head 23 and an arcuate track 101, which track is fixedly attached to members 77, 83 and 87 and describes the arc of a circle whose center coincides with the center line of post 55. Track 101 is preferably U-shaped in cross section. In other words, the track 101 includes a vertical web portion 103 and horizontal upper and lower portions 104, 105. Lower portion 105 is engaged by a pair of rollers 107, 109 which form part of the trough 99 and which trolley additionally includes a U-shaped head 111 fixedly attached and mounted. Bracket 111 is attached to the head 23 by adjustively means as the turnbuckle 113 of usual construction so that the support given to the head may be adjustively means of the turnbuckle.

A similar arrangement is provided for the other of heads 23, which other head is supported from post 57 by means of an arm 115 similar to arm 89. Likewise, a clamp 117 similar to clamp 97 is provided for this other head, and a track 119 similar to track 101 is supported from members 79, 83 and 87 to establish with a trough, not shown, like trough 99, the means by which this opposite end of this head 23 is supported from framework 53. Track 119 forms an arc of a circle with the center thereof coinciding with the center line of post 57.

In the drawings head 23 which is pivotable about post 55 is shown in the off-line position and the other head 23 which is pivotable about post 57 is shown in the position for production to coat articles on the conveyor belt 17. It will be observed that the head 23 which is in the off-line position is disposed to one side of base 13 and generally parallel with the longitudinal axis of the base. Also, it will be noted that this head 23 in the off-line position extends between posts 55 and 73 with the clamp 97 being clamped about the post 73 to hold securely the head in this position. Also, it will be noted that the head 23 in the position for production extends transversely of base 13 between posts 55 and 57 with clamp 117 being attached to post 55. When the head 23 is in this position for production, the head extends over the trough 27 as hereinafter described relative to FIG. 3.

When it is desired to change the paint, perform maintenance work, or to clean one of the heads 23 which is in a position for production, it will be understood that to save time the head 23 which is in the off-line position is prepared for use. It should be noted that the head 23 in the off-line position has the inner portion 25 in a raised position and the trough 27 is in an upper position above the level of top 19. Trough 27 is supported in this upper position by any suitable means as hangers 121 at the opposite ends of the trough which support the trough from inner portion 25. Also, it should be noted that the discharge outlet 123 of trough 27 has attached thereto a drain conduit 125 which conducts the material from trough 27 into tank 45. Conduit 125 is preferably flexible and in the form of a rubber hose which is normally removably attachable portion beneath the head, as shown in FIG. 3, so that to ready this head for pivoting to its off-line position, shown in dotted lines in FIG. 2, it is necessary to first attach the trough to the inner portion 25, as by the hangers 121 hereinafter described, and then raise the inner portion by turning hand crank 127 to carry the trough into the raised position above top 19. Then, this head 23 is swung into the off-line position, shown in dotted lines, and clamped in place. A similar arrangement to that hereinafter described, including a flexible conduit, not shown, is provided for draining the coating material into a tank, not shown, disposed on that side of the base 13 and post 55 hereinafter described. Next, the head 23 which was in the off-line position may be pivoted about post 55 to the position for production previously occupied by the other head 23. Then the trough 27 of this head is detached from inner portion 25 and placed in position below the top 19, as shown in FIG. 3 and the inner portion 25 is lowered to the desired height.

From the foregoing it will be understood that a coating machine 11 is provided in which the interruption of production caused by the cleaning and maintenance of the machine or changing of the paint is reduced or substantially eliminated, particularly as compared with previous arrangements in which the head had to be maintained, cleaned and the paint changed while in position for production on the machine. Additionally, it will be understood that in the present invention the head 23 in the off-line position may be completely tested and adjusted since this head may be operated and the coating material drained into tank 45. This is a substantial saving in time as compared with previous machines which had their production further interrupted after cleaning, etc. by having to test and adjust the machine before starting regular production. It will further be understood that such a coating machine is provided in which the heads are easily and quickly movable into the position for production and the off-line position and, once moved into these positions, are securely held in place. In addition, it will be understood that since the framework 53 is supported independently of base 13, none of the vibration from machine 13 will be transmitted to the curtain 39.

Although the invention has been described and illustrated with respect to a preferred embodiment thereof, it is to be understood that it is not to be so limited since changes and modifications may be made therein which are within the full intended scope of this invention as hereinafter claimed.

I claim:
1. In an apparatus for applying liquid material onto articles by a curtain of the material, a supporting surface, a base mounted on said supporting surface and a coating means movably mounted on said base for conveying articles to be coated, a framework mounted on said supporting surface adjacent said base and extending over said base, at least one arcuate track mounted on said framework, at least one head means for discharging a curtain of the liquid material comprising an outer framing portion and an inner reservoir portion slidably mounted therein, said framework including at least one post on one side of said base, pivot means interposed between said head means and said post for pivotally supporting said head means from said post, means attached to said
head means remote from said pivot means and engaging said track for movable support thereof from said framework, said head means being pivotable between an off-line position on one side of said base and a position for production above said conveyor means and means to raise and lower said inner reservoir portion in the outer frame portion.

2. In an apparatus for applying liquid material onto articles by a curtain of the material, a supporting surface, a base mounted on said supporting surface, conveyor means movably mounted on said base for conveying articles to be coated, a tank mounted on said supporting surface, a framework mounted on said supporting surface adjacent said base and extending over said base, at least one arcuate track mounted on said framework, at least one head means for discharging a curtain of the liquid material comprising an outer frame portion and an inner reservoir portion slidably mounted for vertical movement therein, said framework including at least one post on one side of said base, pivot means interposed between said outer frame head means and said post for pivotally supporting said head means from said post, means attached to said outer frame head means remote from said pivot means and engaging said track for movable support thereof from said framework, said head means being pivotable from off-line positions on opposite sides of said base to a position for production above said conveyor means, and drain means including a trough beneath said head means and a flexible conduit extending between said trough and said tank for draining said head means regardless of its position, means to detachably connect said trough to said slideable inner reservoir portion of said head means, and means to raise and lower said inner reservoir portions and trough in said outer frame portion.

3. In an apparatus for applying liquid material onto articles by a curtain of the material, a supporting surface, a base mounted on said supporting surface, conveyor means movably mounted on said base for conveying articles to be coated, a framework mounted on said supporting surface adjacent said base and extending over said base, a pair of arcuate tracks mounted on said framework, a pair of head means for respectively discharging a curtain of the liquid material comprising an outer inverted U-shaped frame portion and an inner reservoir portion mounted for vertical movement therein, said framework including a pair of posts on opposite sides of said base, a pair of pivot means respectively interposed between said pair of head means and said pair of posts for pivotally supporting said pair of head means respectively from said posts, a pair of means respectively attached to said head means remote from said pivot means and respectively engaging said tracks for movable support thereof from said framework, said pair of head means being selectively pivotable from off-line positions on opposite sides of said base to a position for production above said conveyor means, and means to raise and lower said inner reservoir portion in said outer inverted U-shaped frame portion.

4. In an apparatus for applying liquid material onto articles by a curtain of the material, a supporting surface, a base mounted on said supporting surface, conveyor means movably mounted on said base for conveying articles to be coated, a tank movably mounted on said supporting surface beneath said base, a framework mounted on said supporting surface adjacent said base and extending over said base; said framework including a first pair of spaced posts disposed on one side of said base, a second pair of spaced posts, conveyor means movably mounted on said base for conveying articles to be coated, a tank movably mounted on said supporting surface beneath said base, and a plurality of members rigidly interconnecting said posts adjacent the upper ends thereof; a first head means for discharging a curtain of the liquid material comprising an outer frame portion and an inner reservoir portion slidably mounted for vertical movement therein, means interposed between the outer frame of said first head means and one of said first pair of spaced posts for pivotally supporting said first head means from said one of said first pair of posts, said first head means being pivotable between an off-line position between said first pair of spaced posts and a production position between said one of said first pair of posts and one of said second pair of posts, means attached to the outer frame of said first head means for securing said first head means selectively in said off-line position and said production position for production, a first arcuate track attached to said framework, a first trolley means attached to the outer frame of said first head means and engaging said first track for movable support of said first head means from said framework, first drain means including a first trough beneath said first head means and a first flexible conduit extending between said first trough and said tank for draining said first head means regardless of its position; a second head means for discharging a curtain of the liquid material comprising an outer frame portion and an inner reservoir portion slidably mounted for vertical movement in said outer frame portion, means interposed between the outer frame of said second head means and one of said second pair of spaced posts for pivotally supporting said second head means from said one of said second pair of posts, said second head means being pivotable between an off-line position between said second pair of spaced posts and a production position between said one of said second pair of posts and one of said first pair of posts, means attached to the outer frame portion of said second head means for securing said second head means selectively in said off-line position and said position for production, a second arcuate track attached to said framework, a second trolley means attached to the outer frame portion of said second head means and engaging said second track for movable support of said second head means from said framework, and second drain means including a second trough beneath said second head means and a second flexible conduit extending between said second trough and said tank for draining said second head means regardless of its position, means to detachably connect said troughs to the slideable inner reservoir portion of said first and second head means and means to raise and lower said inner reservoir portions and said troughs in said outer frame portion.

5. In an apparatus for applying liquid material onto articles by a curtain of the material, a supporting surface, a base mounted on said supporting surface, conveyor means movably mounted on said base for conveying articles to be coated, at least one head means for discharging a curtain of the liquid material comprising an outer frame portion and an inner reservoir portion slidably mounted therein, support means attached to said outer frame head means for pivotally supporting said outer frame head means for pivot between an off-line position to one side of said conveyor means and a position for production above said conveyor means, means for supporting said head outer frame means at the end opposite said pivotal support means when the head means is in position for production, and a support means comprising a curved track for supporting said head means in production and off-line position and as it is swung from production position to off-line position and back again, and means to raise and lower the inner reservoir portion in the outer frame portion.

6. In an apparatus for applying liquid material onto articles by a curtain of the material, a supporting surface, a base mounted on said supporting surface, conveyor means movably mounted on said base for conveying articles to be coated, a framework mounted on said supporting surface adjacent said base and extending over said base, at least one head means for discharging a curtain of the liquid material comprising an outer frame portion and an inner trough portion slidably mounted therein, support means interposed between said frame
work and said outer frame head means for pivotally supporting said outer frame head means from said framework, said head means being selectively pivotable between an off-line position on one side of said base and a position for production above said conveyor means, means for supporting said head outer frame means at the end opposite said pivotal support means when the head means is in position for production, and a support means comprising a curved track for supporting said head means in production and off-line position and as it is swung from production position to off-line position and back again, and means to raise and lower the inner reservoir portion in the outer frame portion.

7. The apparatus of claim 5 in which the pouring head is enclosed whereby the liquid coating material is pumped into said inner reservoir portion against an entrapped air cushion.

8. The apparatus of claim 2 comprising means to pass said conveyor beneath said trough below the normal level of said conveyor means when said trough is in production position.

9. The apparatus of claim 1 comprising frame work for supporting said pouring head having supports independent of said base and conveyor means, so that no vibrations are transmitted to said framework and said reservoir.

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