Jan. 27, 1942. F. E. SANBORN 2,271,442

AUTOMATIC SPRAYING MACHINE FOR SPRAYING TRAVELING ARTICLES

Filed Sept. 26, 1940 5 Sheets-Sheet 1

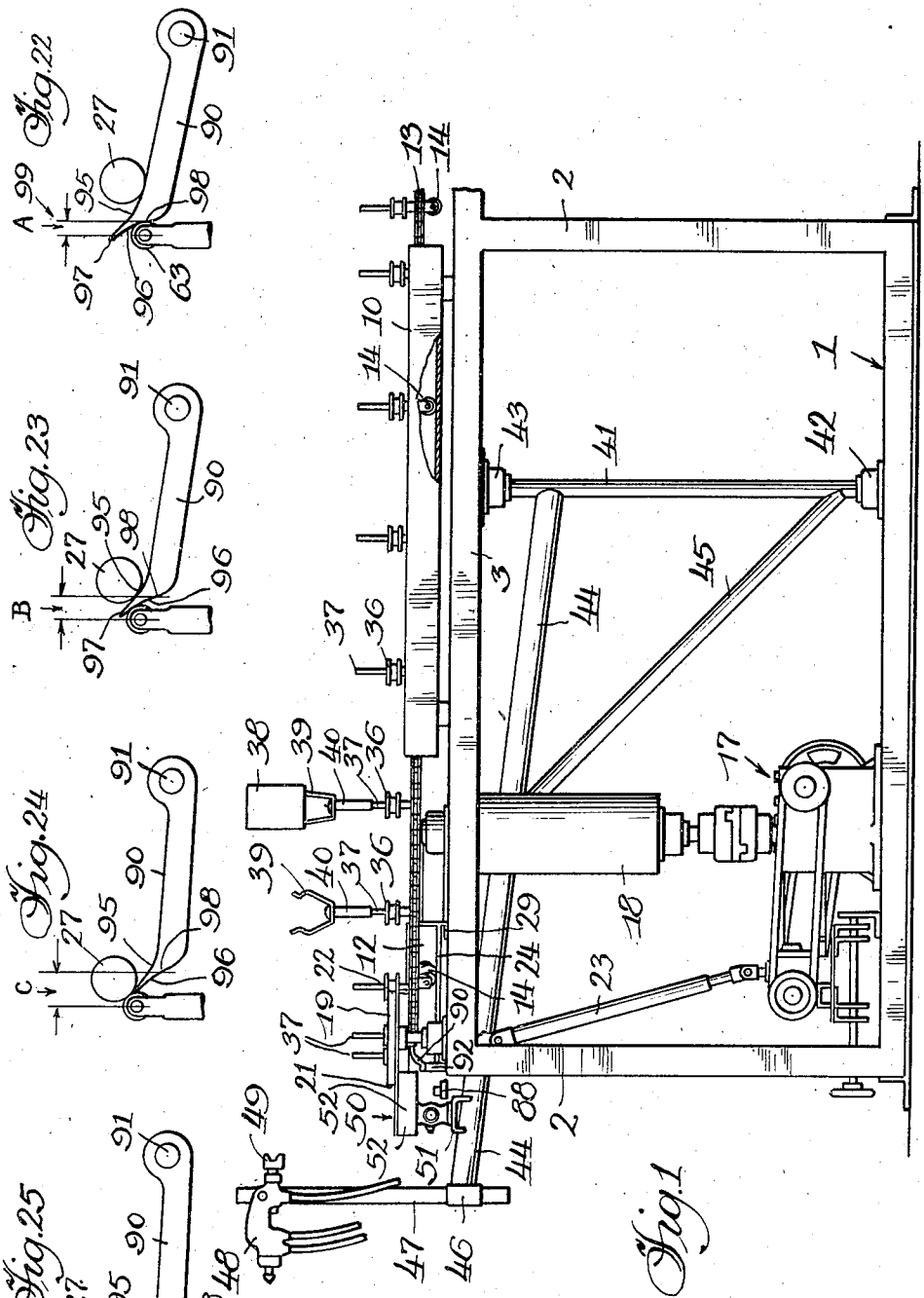


Fig. 1

Fig. 22

Fig. 23

Fig. 24

Fig. 25

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AUTOMATIC SPRAYING MACHINE FOR SPRAYING TRAVELING ARTICLES

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Fig. 5

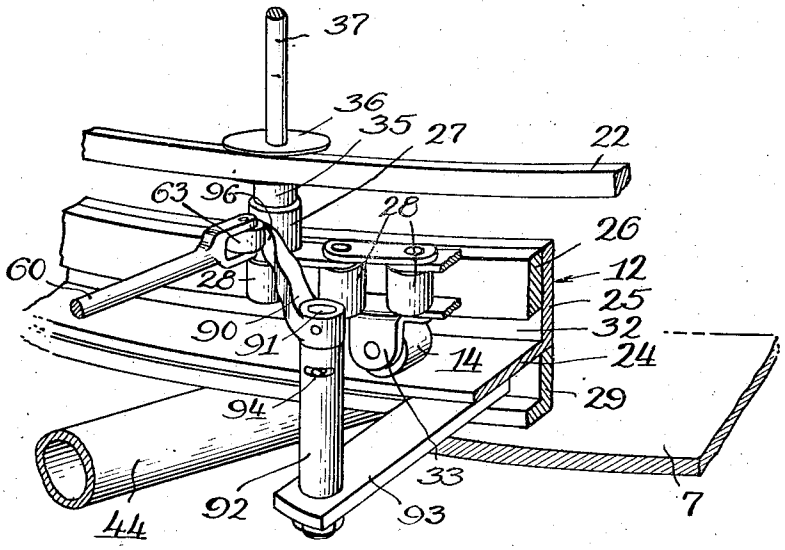
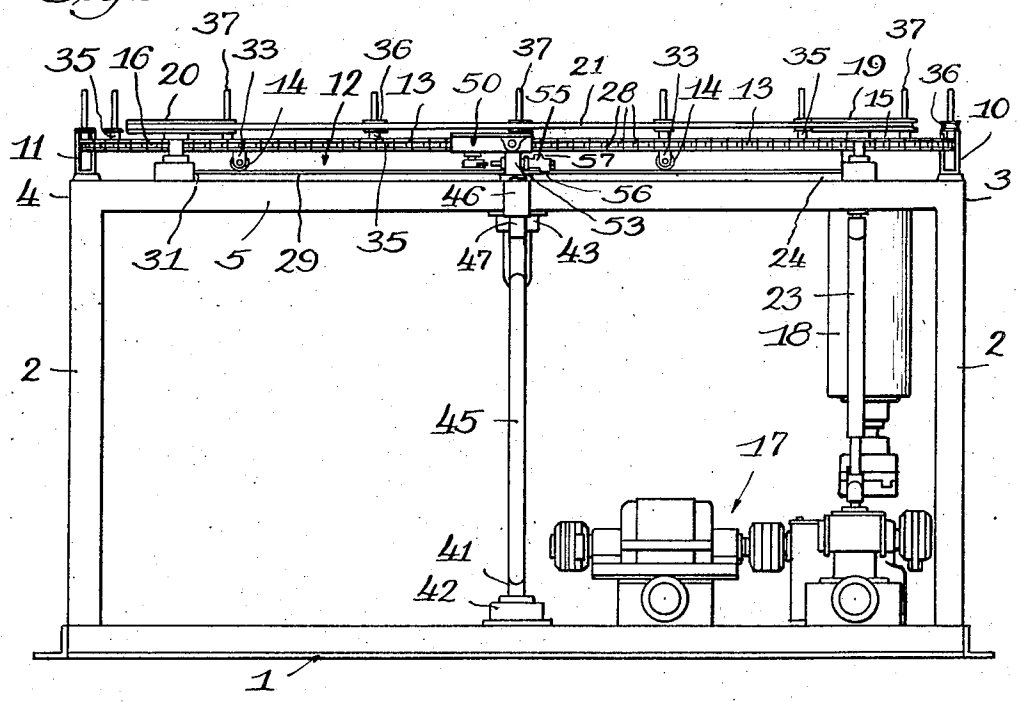


Fig. 2



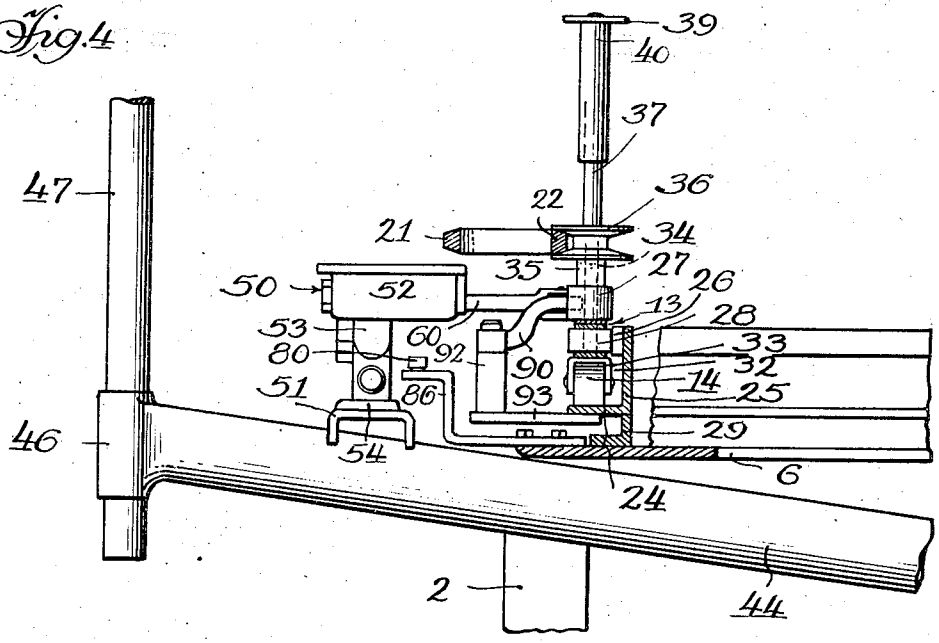
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AUTOMATIC SPRAYING MACHINE FOR SPRAYING TRAVELING ARTICLES

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Fig. 4



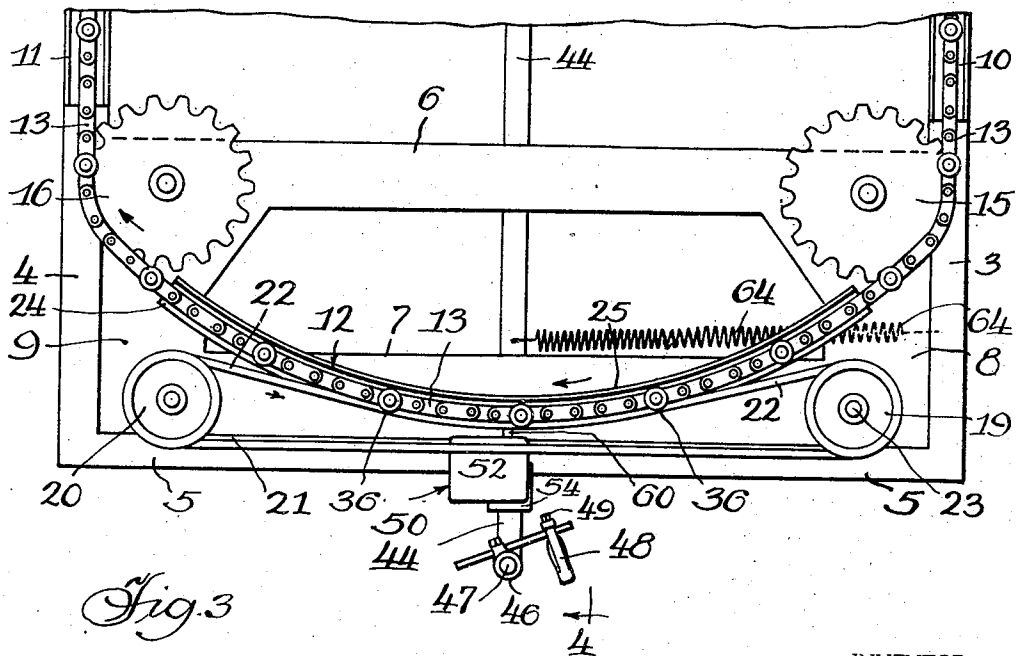


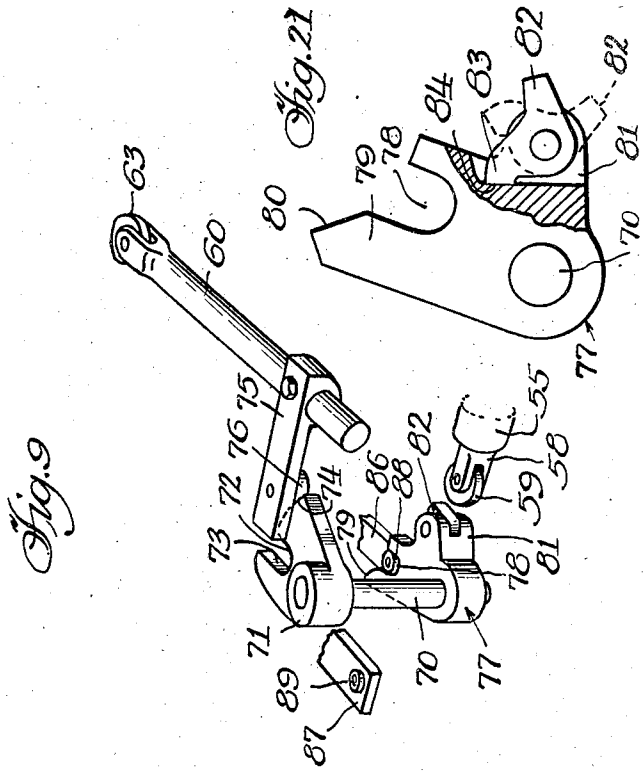
Fig. 3

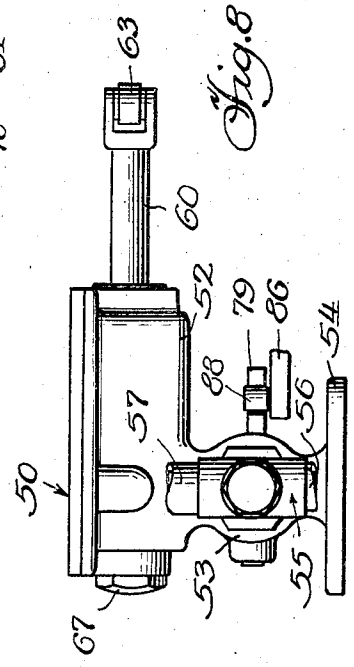
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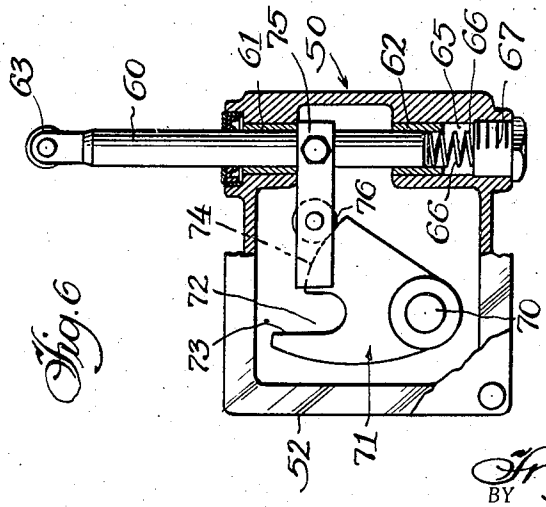
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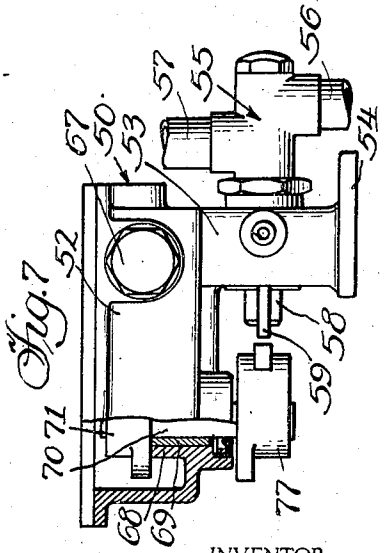
AUTOMATIC SPRAYING MACHINE FOR SPRAYING TRAVELING ARTICLES

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AUTOMATIC SPRAYING MACHINE FOR SPRAYING TRAVELING ARTICLES

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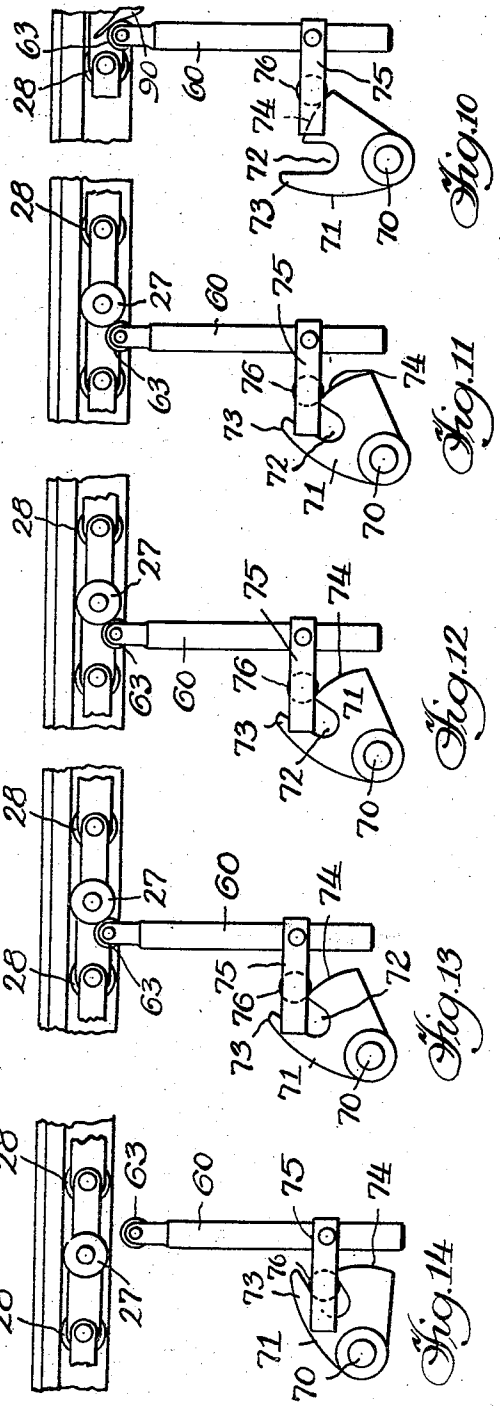


Fig. 10

Fig. 11

Fig. 12

Fig. 13

Fig. 14

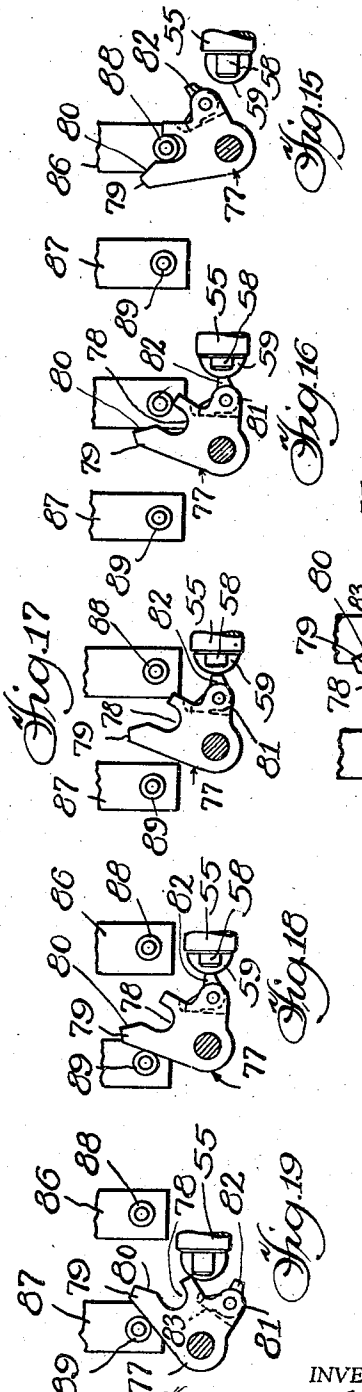


Fig. 15

Fig. 16

Fig. 17

Fig. 18

Fig. 19

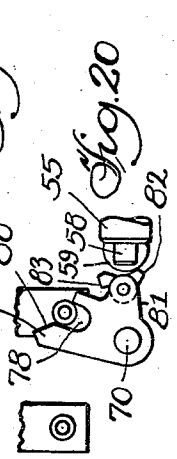


Fig. 20

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UNITED STATES PATENT OFFICE

2,271,442

AUTOMATIC SPRAYING MACHINE FOR SPRAYING TRAVELING ARTICLES

Frank E. Sanborn, Los Angeles, Calif., assignor to Binks Manufacturing Company, Chicago, Ill., a corporation of Delaware

Application September 26, 1940, Serial No. 358,434

15 Claims. (Cl. 91—45)

The present invention relates to automatic machines for spraying articles and, more particularly, to novel means for controlling the spraying of the article while it is traveling in the machine.

Among the objects of the invention is to provide a novel control means for effecting a spraying of the articles while traveling and rotating. The articles are carried on and by a traveling conveyor which may be in the form of a chain and they are held on rotary supports, such as spindles, carried by the conveyor at given points therealong.

For a given part of the travel of the spindles, they engage a belt for causing the spindles and the articles thereon to rotate, so that all parts of the article may be presented to the spray from the spraying means, such as a spray gun, during such part of the travel of the article. In the embodiment chosen to illustrate the invention, the conveyor travels along and is guided by a track means comprising track sections or segments. One of the segments of the track is arc-shaped whereby the part of the travel of the article above mentioned, and during which it is sprayed, is also curved or arc shaped.

The controlling means is on a movable support, such as a swinging arm pivoted at the center of the curvature of the arc-shaped track, so that the controlling means will move at a constant distance from the arc-shaped path of travel of the article. The support also carries a spray gun so that it will also move or swing in the same parallel path.

The conveyor carries at given intervals control elements such as rollers, whereby they also travel in the arc-shaped path along the arc-shaped track portion. The controlling means has a movable control member, such as a bolt, which is moved into the path of the control elements for engagement by the traveling element with the member and hence causes an advance movement or swing of the supporting means, the controlling means and the gun consonantly with the travel of the article, the latter being sprayed during such advance movement and within the given part of the travel referred to above. At the end of such advance movement or swing, the control means engages a final limit stop to stop such movement and also to withdraw or unlock the bolt from the control roller, thus moving the bolt out of the path of such roller. Immediately the support and the parts carried by it are given a rapid return movement by a spring connected to the support and a fixed part of the machine. The control means then engages another or prime limit stop to stop such return movement and also to move the bolt into the path of the next control element or roller. The prime and final stops are adjustably set at desirable points on the machine and in the path of movement or swing of the control means.

Other objects, advantages, capabilities, and features are comprehended by the invention, as will later appear and as are inherently possessed by the invention.

Referring briefly to the drawings:

Fig. 1 is a view in side elevation of the machine embodying the invention.

Fig. 2 is a view in front elevation of the same.

Fig. 3 is a part top plan view of the same.

Fig. 4 is a part sectional view taken in a plane represented by line 4—4 of Fig. 3 of the drawings.

Fig. 5 is a fragmentary view in perspective of an accelerating feature.

Fig. 6 is a horizontal sectional view of the upper portion of the control means forming a novel part of the invention.

Fig. 7 is a front elevational view, with parts shown in broken section, of the device in Fig. 6.

Fig. 8 is a side view in elevation of the same.

Fig. 9 is a view in perspective in space suspension of operated elements thereof.

Figs. 10, 11, 12, 13 and 14 are top plan views of different stages of operation of the same.

Figs. 15, 16, 17, 18 and 19 are similar views of the lower part of the same in respective stages of operation.

Fig. 20 is a similar view showing the latching back of the lower part of the control means.

Fig. 21 is a detailed view, partly broken away, and on an enlarged scale, to show the cam latch in different positions.

Figs. 22, 23, 24 and 25 are fragmentary top plan views of different stages of operation when using the accelerating feature, such stages occurring between the stages of operation shown in Figs. 10 and 11.

Referring more in detail to the drawings, the embodiment selected to illustrate the invention is shown in a machine comprising a frame having a base 1 (Figs. 1 and 2), supporting uprights 2, upper side parts 3 and 4, and an upper front part 5. Fixed to the side parts 3 and 4, and to the front part 5, is a top plate having rear and forward transverse portions 6 and 7, and short end portions 8 and 9 at the sides 3 and 4 (Fig. 3). On parts 3 and 4 are supported chain guides or tracks 10 and 11, and on the front top plate

portion 7, as also on the portions 8 and 9, is supported an arc-shaped chain guide track 12, the ends of which are fixed to the parts 8 and 9.

An endless chain type of conveyor 13 having supporting rollers 14 carried by it rides over these tracks. The chain meshes with sprocket wheels 15 and 16 (Fig. 3) rotatively supported on the top plate at the ends of the portions 6.

On the base 1 (Figs. 1 and 2) is generally a variable speed power transmission device 17 operatively connected by way of a drive member 18 to the sprocket wheel 15 which acts as a driver for the chain. The chain travels, for purposes of illustration, over the arc-shaped track 12 from the right to the left, as shown by the arrow in Fig. 3.

On the front portion of the top plate portions 8 and 9 are rotatably supported grooved pulleys 19 and 20 for driving a belt having a straight lap 21 and a curved lap 22 (Fig. 3). Pulley 19, which is the driving pulley, is driven by a shaft 23 operatively connected to the power transmission means 17 (Figs. 1 and 2).

Referring to Figs. 4 and 5, the arc-shaped track 12 is shown as comprising an L-shaped part, the lower portion 24 of which constitutes a base rail of the track and on which ride the rollers 14 carried by the chain. At the back is a back portion 25 to which is fixed a back rail 26 against the front face of which travel the chain rollers 28 carried by the chain 13 and rotatable on the chain studs.

At suitable intervals are rollers 27 carried by certain pivot studs of the chain links, these rollers 27 traveling in an arc-shaped path above the chain and acting as control elements to pick up and advance a control device, later more fully described. The rollers 28 are preferably for tracking the chain. They also mesh with the teeth of the sprockets.

To the base rail 24 is fixed, as by welding, a curved angle bar 29 for supporting and fixing the track 12 upon and to the plate portions 7, 8 and 9 (Figs. 1, 2, 4 and 5). The channel-like space 32 (Fig. 4) beneath the lower edge of the rail 26 provides a clearance for the saddles 33 for the rollers 14. The saddles 33 are fixed to certain lower links of the chain at intervals.

At intervals, certain pivots of the chain links have upwardly extending studs 34 (Fig. 4) which carry the rollers 27. On the upper ends of these studs are spindle means each comprising a socket 35 (Figs. 4 and 5) that fits on the stud 34, a grooved pulley 36 engageable with the belt lap 22 as the chain carries these spindle means along the arc-shaped track 12, and an upwardly extending spindle 37. The spindle belt 21—22 may be driven in either direction as desired, and at such speed that the lap 22 will rotate the spindles to turn the articles carried by them as they travel, for the proper spraying of the articles.

The article, such as a can 38, shown in Fig. 1, is carried by a holder having a spring clip 39 to engage the article and a socketed shank 40 to fit over the spindle 37.

Concentric with the arc-shaped track 12 is a shaft 41 (Fig. 1) rotatable in bearing means 42 on the base 1 and the bearing means 43 secured to an upper part (not shown) of the machine frame. Fixed to this shaft 41 is an arm 44 trussed by a brace 45 fixed to a lower part of the shaft 41 and to an intermediate part of the arm 44. At the outer end of the arm 44 is a sleeve 46 in which is adjustably mounted a post 47. On the upper portion of the post 47 is adjustably mounted a suitable spray gun 48 (Figs. 1 and 3) which has a spray nozzle 49 from which coating material is sprayed in a direction to coat the traveling and rotating articles as they are conveyed relative to the arc-shaped track 12. The gun may be of the type disclosed in the copending application of Harrison et al., Serial No. 260,040, filed March 6, 1939, for Automatically operated spraying system.

For the purpose of having the spray gun spray the traveling article during a given period of time sufficient to complete the spraying of the article, and also for the gun to move consonantly with the travel of the article during that period, a novel control means is provided. Such means is shown generally at 50. It is mounted upon a saddle 51 fixed as by welding to the arm 44 (Fig. 4) and comprises a casing 52 (Figs. 6, 7 and 8) provided with a standard 53 having a base 54 fixed upon the saddle 51. The arm 44 acts as a swinging support for the control means.

In the standard 53 is mounted an air valve structure 55 having air inlet 56 and outlet 57, the latter being connected to the gun 48 for operating it by air. Protruding from the valve 55 is a spring pressed valve operating stem 58 carrying a cam roller 59. This air controlled valve may be of the type disclosed in the copending application above referred to.

Slidably mounted in the casing 52 is a pick up or control member in the form of a lock bolt 60 supported in sleeves 61 and 62 suitably secured in the casing as shown. The rearward and outer end of the bolt 60 carries a roller 63 which is engaged by the control element or roller 27 carried by the chain so as to pick up and give an advance movement to the device 50 parallel to the path of movement of rollers 27 and the chain until the bolt 60 is released at the end of the swing of the device 50, as later described, whereupon the arm 44 with the parts carried by it is quickly swung back and given a return movement to its initial position by a suitable spring 64 connected to the arm 44 and a fixed part of the machine frame, such as the side part 3 (Fig. 1).

Forwardly of the sleeve 62 is provided a socket 65 (Fig. 6) in which is a spring 66 interposed between the forward end of the bolt 60, and a screw plug 67 secured in the end of the socket 65, the spring acting against the bolt 60 normally to push it rearwardly in position for the roller 63 to be in the path of travel of the roller 27 for engagement by the next roller 27.

In the casing is a hub 68 (Fig. 7) carrying a bushing 69 in which is rotatably mounted a shaft 70. To the upper end of the shaft 70 is fixed a forked cam 71 having a notch 72, a cam finger 73, and an arc-shaped cam part 74 which has its cam edge concentric with the axis of the shaft 70. The cam acts as a lock tumbler for the bolt 60.

To the bolt 60 is suitably secured a bar 75 carrying a roller 76 which normally rides on or acts against the arc-shaped cam edge of the cam portion 74.

To the protruding lower end portion of the shaft 70 is fixed a forked cam or tappet 77 having a notch 78, a cam finger 79 with a cam edge part 80. This cam has a bifurcation 81 in which is pivotally mounted an L-shaped latch having a nose 82 and a toe 83. Normally the toe 83 seats against a surface 84 under the force of a suitable spring (not shown). The nose 82, when moved

against the roller 59 of the air valve and in line with the stem 58, functions to open and hold open the air valve during which time the air flows to the gun 48 to operate it, as more fully later described.

The operation is controlled by a limit stop means. This comprises a pair of stops 86 and 87 carrying pins on which are rollers 88 and 89. The tappet cam 77 engages these rollers. These stops are adjustably located as required on the machine, as on the plate part 7, in the path of swing of the control means, and particularly of the cam tappet 77, and at such distances as to gauge the amplitude of swing of the arm 44, the control means 50 and the spray gun 48. These are positioned to cooperate with the lower cam 77 so that at the initial position of the control means the roller 88 is in the notch 78 of the lower cam 77, see Fig. 15. At the end of the advance swing of the control means, the cam finger 79 is in engagement with and stopped against the roller 89, as shown in Fig. 19. At the end of the return swing of the control means, the cam finger 79 is in engagement with and stopped against the roller 88, as shown in Fig. 15.

The device may or may not use an accelerator. In the event of using one, it comprises an accelerator member 90 (see Figs. 2, 3, 4, 5, 22, 23, 24 and 25). In this case the accelerator is connected to a shaft 91 rotatable in a sleeve 92 secured at its lower end to a bar or bracket 93 in turn fixed to the lower part 24 of the track 12. A suitable spring (not shown) is connected to the shaft 41 to swing the accelerator 90 within the limits of the pin and slot means 94, shown in Fig. 5, and with its free end normally in the path of travel of the roller 27. The accelerator member 90 has cam surfaces 95 and 96, and a tip 97. Roller 27 acts against cam surface 95, and the cam surface 96 acts against the roller 63 of the bolt 60.

In operation, the articles are carried on the spindles as the chain travels. As the chain reaches and travels along the arc-shaped track 12, the pulley 36 of a spindle engages the belt 21—22 whereby the spindle and the article carried by it rotate. The belt may be driven in either direction, as desired. At the same time, roller 27 corresponding thereto engages roller 63 of the bolt 60 and starts the advance swing or movement of the pick up or control means 50, the arm 44 and the gun 48 about the axis of the shaft 41.

The initial position is shown in Figs. 10 and 15, before the roller 27 effects its engagement. As the roller 27 effects engagement, the lower cam or tappet 77 turns and leaves the stop 88 to take the position shown in Fig. 16, whereupon the nose 82 of the latch acts on the air valve roller 59 to open the air valve 55 for the air to operate the gun 48, whereby spraying occurs on the traveling and rotating article. At the same time the upper cam 71 which also has turned still has its cam edge 74 in contact with the roller 76 of the bar 75, as shown in Fig. 11, thus holding the bolt 60 extended and locked with roller 27. The lower cam 77 has left the stop 88, as shown in Fig. 16.

On further swing, the parts referred to move to the position shown in Figs. 12 and 17. Toward the end of the swing, the lower cam or tappet 77 brings its cam finger 79 into contact with the stop 89, as shown in Fig. 18, the roller 76 of the bar 75 still being against cam edge 74 but ready to enter the notch 78, as shown in Fig. 13.

Then the lower cam 77 turns to the position shown in Fig. 19, whereby the nose 82 of the latch has left the valve roller 59, and whereby the air valve 55 is automatically closed and the spraying is stopped. At this instant, the cam finger 73 has moved against the roller 76 to cause a retraction of the bolt 60 and roller 63 out of engagement with roller 27 of the chain. The spring 64 connected to the arm 44 acts immediately to quickly return or swing the device to initial position.

On such back swung or return movement, the lower cam or tappet 77 engages the stop 88 so as to turn, as shown in Fig. 20, whereby the nose 82 latches freely over the air valve roller 59 from the position shown in Fig. 20 to that shown in Fig. 15. At the same time, the upper cam or tumbler 71 turns so as to release the roller 76 from the notch 72, whereby the spring 65 (Fig. 6) acts to return the bolt 60 and roller 63 into the path of roller 27 (Fig. 10) to be engaged with the next or successive roller 27.

In the event of using the accelerator 90, the roller 27 first contacts the cam portion 95 thereof. This causes the cam portion 96 to act against the roller 63 of the bolt 60 to start the swinging movement of the device 50, arm 44 and gun 48, as shown in Fig. 22. This action continues, as shown in Fig. 23. In Fig. 24, the tip 97 is about to leave the roller 27, and in Fig. 25 the tip has left roller 27 and the latter is now engaged with the roller 63 of the bolt 60. The phases of operation shown in Figs. 22, 23, 24 and 25 all occur between the phases of operation shown in Figs. 10 and 11.

To illustrate the accelerating effect, it will be noted in Fig. 22 that the roller 63 is in contact with the cam face 96 at the point 98 and that the distance between such point of contact and the center of the roller 63 is represented at A, between the lines and arrows, generally designated by 99. In Figs. 23, 24 and 25, such distances are represented at B, C and D, respectively. Hence it is obvious therefrom how the pick up means is given an initial acceleration before the roller 27 contacts the roller 63, as shown in Fig. 25. This accelerating effect has the advantage of starting the swing smoothly and without shock.

While I have herein described and upon the drawings shown an illustrative embodiment of the invention, it is to be understood that the invention is not limited thereto but comprehends other constructions, arrangements of parts, details, features or the like, without departing from the spirit of the invention.

Having thus disclosed the invention, I claim:

1. In an automatic spraying machine having an article conveyor with means for rotating the article during a part of the conveying travel of the article; a device for controlling the spraying of the article during said part of its travel, comprising a movable support carrying a spraying means, means for guiding the support for advance and return movements in a path parallel to the path of said part of travel of the article, prime and final stops on the machine for determining the range of movement of the support, a control element carried by the conveyor, a control member carried by the support and movable into the path of the element for engagement thereby for advance movement of the support from the prime stop to the final stop consonantly with the travel of the article and movable out of the path of said element for disengagement therefrom for return movement of the support from the final

stop to the prime stop, means operatively connected to the support for producing said return movement of the support, and movable tappet means carried by the support and operatively connected to said member for moving said member into the path of said element by engagement of the tappet means with the prime stop and for moving said member out of the path of said element by engagement of the tappet means with the final stop, said tappet means having means for engaging said stops for limiting the movements of the support and for moving the tappet means.

2. In an automatic spraying machine having an article conveyor with means for rotating the article during a part of the conveying travel of the article; a device for controlling the spraying of the article during said part of its travel, comprising a movable support carrying a spraying means, means for guiding the support for advance and return movements in a path parallel to the path of said part of travel of the article, prime and final stops on the machine for determining the range of movement of the support, means for producing advance movement of the support consonant with the travel of the article, comprising a control element carried by the conveyor, and a control member carried by the support and movable into the path of said element for engagement thereby, means for moving said member out of and into said path of said element, comprising a movable part carried by the support and operatively connected to said member and located to be engaged and moved by said final stop to release said member from said element and to be engaged and moved by said prime stop to introduce said member into the path of said element, means operatively connected to the support for producing return movement thereof after engagement of said part with said final stop, said stops being located in the path of advance and return movements of said part with the support for limiting said movements of the support.

3. In an automatic spraying machine having an article conveyor with means for rotating the article during a part of the conveying travel of the article; a device for controlling the spraying of the article during said part of its travel, comprising a movable support carrying a spraying means, means for guiding the support for advance and return movements in a path parallel to the path of said part of travel of the article, prime and final stops on the machine for determining the range of movement of the support, a control element carried by the conveyor, a control member carried by the support and movable into and out of the path of said control element, stop engaging means carried by the support and connected to said member to move the latter, said latter means being located to respectively engage the final and prime stops for respectively moving said member out of and into said path of said element, and spring means for producing return movement of the support.

4. In an automatic spraying machine having an article conveyor with means for rotating the article during a part of the conveying travel of the article; a device for controlling the spraying of the article during said part of its travel, comprising a movable support carrying a spraying means, means for guiding the support for advance and return movements in a path parallel to the path of said part of travel of the article, spaced stops on the machine for limiting said movements of the support, cam means on the support for engaging said stops at the ends of said movements of the support, a control element carried by the conveyor, a movable control member on the support and located in one of its positions in the path of the control element to be engaged by said element and moved therewith for advance movement of the support, said member being operatively associated with said cam means for disengagement of said member from said element by said cam when engaging a stop at the end of the advance movement of the support, a spring connected to the machine and to the support of return movement of the support to its initial position for engagement of the cam means with the other stop to move said member into the path of said element.

5. In an automatic spraying machine having an article conveyor with means for rotating the article during a part of the conveying travel of the article; a device for controlling the spraying of the article during said part of its travel, comprising a movable support carrying a spraying means, means for guiding the support for advance and return movements in a path parallel to the path of said part of travel of the article, spaced stops on the machine for limiting said movements of the support, cam means on the support for engaging said stops at the ends of said movements of the support, a control element carried by the conveyor, a movable control member on the support and located in one of its positions in the path of the control element to be engaged by said element and moved therewith for advance movement of the support, said member being operatively associated with said cam means for disengagement of said member from said element by said cam when engaging a stop at the end of the advance movement of the support, a spring connected to the machine and to the support for return movement of the support to its initial position for engagement of the cam means with the other stop to move said member into the path of said element, said cam means comprising a control cam operatively connected to said member to move said member into and out of the path of said element, a tappet cam which engages said stops to be moved by engagement thereof with said stops, and means rigid with said cams for movement of said cams in unison.

6. In an automatic spraying machine having an article conveyor with means for rotating the article during a part of the conveying travel of the article; a device for controlling the spraying of the article during said part of its travel, comprising a movable support carrying a spraying means, means for guiding the support for advance and return movements in a path parallel to the path of said part of travel of the article, adjustable spaced stops on the machine for selectively limiting advance and return movements of the support, a control element carried by the conveyor, a movable control member carried by the support to be moved into and out of the path of said elements for engagement with and disengagement from said element, cam means operatively associated with said member to move said member into and out of said path of said element when said cam means is moved, said cam means having cam portions for engaging said stops at the ends of movement of the support for movement of the cam means by engagement thereof with the stops, a spring connected to the machine and to the support for return movement of the support to its initial position for engage-

ment of the cam means with the other stop to move said member into the path of said element.

7. In an automatic spraying machine having an article conveyor with means for rotating the article during a part of the conveying travel of the article; a device for controlling the spraying of the article during said part of its travel, comprising a movable support carrying a spraying means, means for guiding the support for advance and return movements in a path parallel to the path of said part of travel of the article, adjustable spaced stops on the machine for selectively limiting advance and return movements of the support, a control element carried by the conveyor, a movable control member carried by the support to be moved in one direction into the path of said element for engagement by said element for advance movement of said member and said support as a unit in said parallel path from one to the other of said stops and to be moved in another direction out of the path of said element for disengagement therefrom for return movement of said member and said support as a unit from said other to said one of said stops, means operatively connected to said support for return movement of said support.

8. In an automatic spraying machine having an article conveyor with means for rotating the article during a part of the conveying travel of the article; a device for controlling the spraying of the article during said part of its travel, comprising a movable support carrying a spraying means, means for guiding the support for advance and return movements in a path parallel to the path of said part of travel of the article, adjustable spaced stops on the machine for selectively limiting advance and return movements of the support, a control element carried by the conveyor, a movable control member carried by the support to be moved into and out of the path of said element for engagement with and disengagement from said element, a tappet means on the support and operatively connected to said member to move said member when said tappet means is moved, said tappet means being located to engage said stops and to be moved by said stops at the ends of movement of said support, and means for return moving the support to one of said stops after disengagement of the tappet means from the other of said stops.

9. In an automatic spraying machine having an article conveyor with means for rotating the article during a part of the conveying travel of the article, a device for controlling the spraying of the article during said part of its travel, comprising a movable support carrying a spraying means, means for guiding the support for advance and return movements in a path parallel to the path of said part of travel of the article, prime and final stops on the machine for determining the range of movement of the support, a control element carried by the conveyor for producing said advance movement of the support, governing means carried by the support and having a control member movable into and out of the path of said element to be engaged therewith and disengaged therefrom at given points of the travel of said element, said governing means also having a movable part located to engage said stops for limiting said advance and return movements of the support and for moving said control member, and means for producing said return movement of the support after disengagement of the control member from said element.

10. In an automatic spraying machine having an article conveyor with means for rotating the article during a part of the conveying travel of the article, a device for controlling the spraying of the article during said part of its travel, comprising a movable support carrying a spraying means, means for guiding the support for advance and return movements in a path parallel to the path of said part of travel of the article, prime and final stops on the machine for determining the range of movement of the support, a control element carried by the conveyor for producing said advance movement of the support, governing means carried by the support and having a control member movable into and out of the path of said element to be engaged therewith and disengaged therefrom at given points of the travel of said element, said governing means also having a movable part located to engage said stops for limiting said advance and return movements of the support and for moving said control member, and means for producing said return movement of the support after disengagement of the control member from said element, said movable control member being slidable in said governing means and having a projecting end portion for engaging with and disengaging from said element.

11. In an automatic spraying machine having an article conveyor with means for rotating the article during a part of the conveying travel of the article, a device for controlling the spraying of the article during said part of its travel, comprising a movable support carrying a spraying means, means for guiding the support for advance and return movements in a path parallel to the path of said part of travel of the article, prime and final stops on the machine for determining the range of movement of the support, a control element carried by the conveyor for producing said advance movement of the support, governing means carried by the support and having a control member movable into and out of the path of said element to be engaged therewith and disengaged therefrom at given points of the travel of said element, said governing means also having a movable part located to engage said stops for limiting said advance and return movements of the support and for moving said control member, and means for producing said return movement of the support after disengagement of the control member from said element, said movable control member being slidable in said governing means and having a projecting end portion for engaging with and disengaging from said element, said movable part having a cam portion associated with said member for holding the latter in position for engagement with said element in one position of said cam portion and for releasing said member in another position of said cam portion.

12. In an automatic spraying machine having an article conveyor with means for rotating the article during a part of the conveying travel of the article; a device for controlling the spraying of the article during said part of its travel, comprising a movable support carrying a spraying means, means for guiding the support for advance and return movements in a path parallel to the path of said part of travel of the article, prime and final stops on the machine for determining the range of movement of the support, a control element carried by the conveyor for producing said advance movement of the support, governing means carried by the support and having a control member movable into and out of the path of said element to be engaged therewith and dis-

engaged therefrom at given points of the travel of said element, said governing means having angularly movable arms with one of said arms located to move said control member and another of said arms located to engage said stops for limiting said movements of the support and for moving said control member, and means for producing said return movement of the support after disengagement of the control member from said element.

13. In an automobile spraying machine having an article conveyor with means for rotating the article during a part of the conveying travel of the article; a device for controlling the spraying of the article during said part of its travel, comprising a movable support carrying a spraying means, means for guiding the support for advance and return movements in a path parallel to the path of said part of travel of the article, prime and final stops on the machine for determining the range of movement of the support, a control element carried by the conveyor for producing said advance movement of the support, governing means carried by the support and having a control member movable into and out of the path of said element to be engaged therewith and disengaged therefrom at given points of the travel of said element, said movable control member being slidable in said governing means and having a projecting end portion for engaging with and disengaging from said element, said governing means having pivoted arms with one of said arms located to move said control member and another of said arms located to engage said stops for limiting said movements of the support and for moving said control member, and means for producing said return movement of the support after disengagement of the control member from said element.

14. In an automatic spraying machine having an article conveyor with means for rotating the article during a part of the conveying travel of the article; a device for controlling the spraying of the article during said part of its travel, comprising a movable support carrying a spraying means, means for guiding the support for advance and return movements in a path parallel to the path of said part of travel of the article, prime and final stops on the machine for determining the range of movement of the support, a control element carried by the conveyor for producing said advance movement of the support, an accelerator pivotally supported on the machine and having a portion thereof extending into the path of said element to be engaged and moved thereby, a governing means carried by the support and having a movable control member provided with a portion movable into the path of said element and adjacent said portion of said accelerator to be engaged by the latter during an initial portion of the advance movement of said control member and support, said accelerator portion having cam portions located for engagement of one of said cam portions by said element to swing said accelerator and by another of said cam portions to cam said control member with an accelerating movement to a point where said element leaves the accelerator and engages said control member for further advance movement of said member and the support, said governing means also having a movable part located to engage said stops for limiting said advance and return movements of the support and for moving said control member, and means for producing said return movement of the support after disengagement of the control member from said element.

15. In an automatic spraying machine having an article conveyor with means for rotating the article during a part of the conveying travel of the article; a device for controlling the spraying of the article during said part of its travel, comprising a movable support carrying a spraying means, means for guiding the support for advance and return movements in a path parallel to the path of said part of travel of the article, prime and final stops on the machine for determining the range of movement of the support, a control element carried by the conveyor for producing said advance movement of the support, governing means carried by the support and having a movable member movable into and out of the path of said element, and a movable part located to engage said stops for limiting said movements of the support and for moving said member, means for producing said return movement of said support, and an accelerating means movably carried by the machine and movable into and out of said path of said element and against said member to give said member an initial accelerating movement thereof when engaged by said element.

FRANK E. SANBORN.

CERTIFICATE OF CORRECTION.

Patent No. 2,271,442. January 27, 1942.

FRANK E. SANBORN.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 4, second column, line 14, claim 4, for "support of" read --support for--; page 6, first column, line 11, claim 13, for "automobile" read --automatic--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 10th day of March, A. D. 1942.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.