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MECHANISM FOR COATING SIDE SEAMS OF CANS

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2 Sheets-Sheet 1

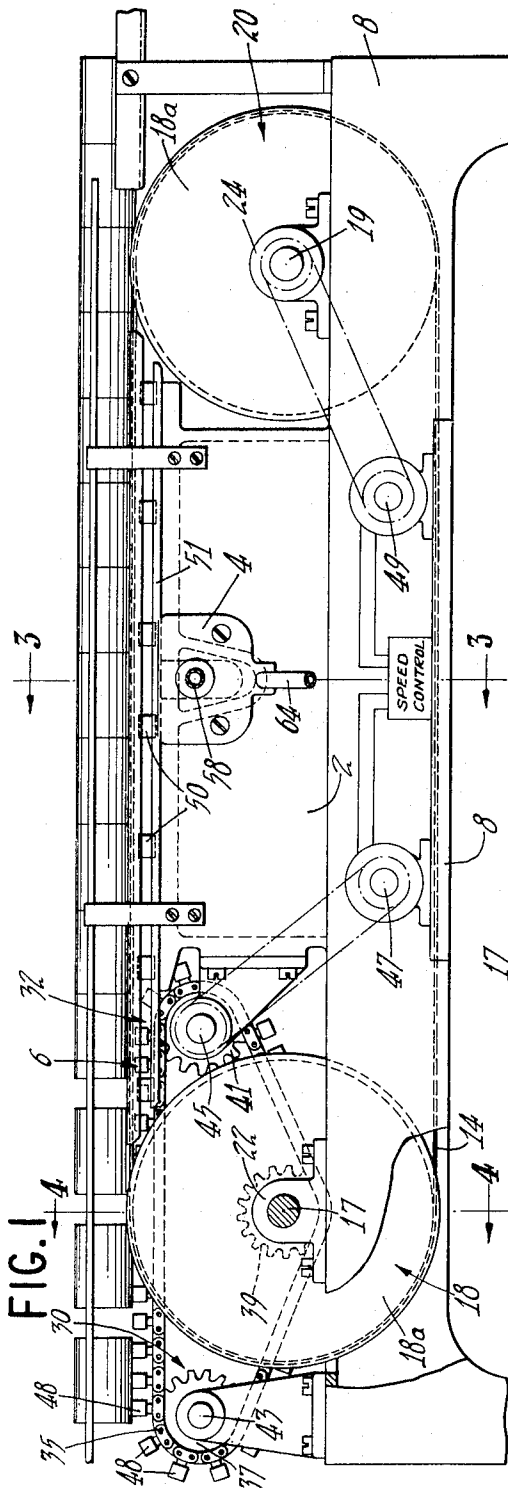
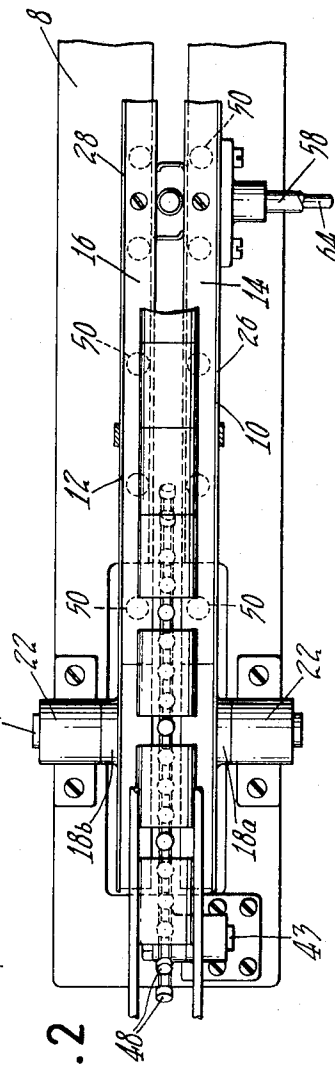


FIG. 2

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FIG. 3

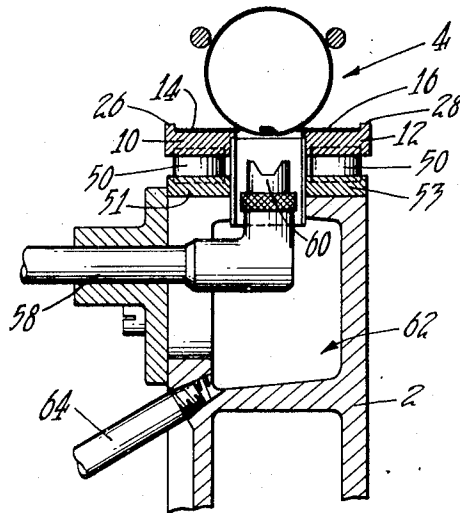
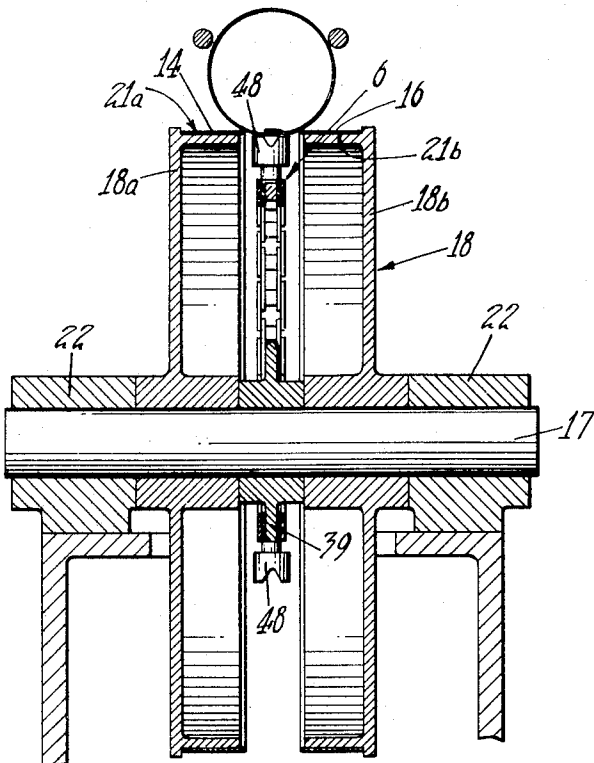


FIG. 4



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MECHANISM FOR COATING SIDE SEAMS OF CANS

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8 Claims. (Cl. 118—301)

This invention relates to a mechanism for coating the side seams of cans, and more particularly to an improved mechanism for feeding cans in coaxial, end abutting relation past a coating station while concurrently providing a mask which insures the formation of uniform side seam stripes on the cans.

In the manufacture of lithographed cans, for example, the can body is coated while it is in a flat sheet form, with provision being made to leave an uncoated stripe at edges of the body which will be abutted during can formation. This uncoated stripe is required in order to insure a good side seam solder joint, and therefore, lithographed cans, of conventional form, have an uncoated stripe at their side seam. In some instances, however, customers demand that the side seam be coated to enhance the appearance of the finished can and in view of the above mentioned soldering requirement it follows that if side seams are to be coated at all, the coating must be applied after the side seam has been soldered. Therefore, it is a first object of this invention to provide an improved mechanism for coating the side seam of can bodies after they have been soldered.

Since cans are processed at the rate of many hundred a minute, it can be appreciated that some continuous application device—such as a paint sprayer or fountain brush—should be employed to coat the side seams in order to eliminate the expensive cumbersome control equipment that would be required for rapid cycle intermittent operation of a coating device, and it is well known in the art that side seam stripes are most efficiently formed on cans by feeding them in end abutting or stovepipe relation past a continuously operative coating device, whereupon it is necessary only to mask the lateral limits of the side seam in order to produce uniform stripes. Accordingly, it is a further object of this invention to provide an improved mechanism for feeding cans in end abutting or stovepipe relation past a continuous supply coating station.

It is a still further object of this invention to provide a mechanism which in addition to aiding the feeding of can bodies in end abutting relation serves the dual function of acting as a mask defining the lateral limits of the side seam that is to be coated.

It can be recognized further that, unless the lateral mask is held in close contact with the can body, material applied under pressure might leak past the mask. Accordingly, it is a still further object of this invention to provide an improved lateral mask for side seams of cans which acts in combination with devices for insuring close contact between the lateral mask and the can bodies at the time of coating.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

FIGURE 1 is a side elevation view of a spray table embodying the instant invention;

FIG. 2 is a top plan view of a portion of the spray mechanism shown in FIG. 1;

FIG. 3 is an enlarged sectional view taken substantially along the plane 3—3 of FIG. 1 in the direction of the arrows, with parts broken away, and

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FIG. 4 is an enlarged sectional view taken substantially along the plane 4—4 of FIG. 1 in the direction of the arrows, parts being broken away.

Briefly this invention relates to an improved side seam coating mechanism wherein preformed can bodies, which have been supplied to a spray table, are fed by a unique driving device that positions the cans in end abutting or stovepipe fashion, while they are moved across a coating station. Magnetic elements are used in conjunction with a portion of the driving device to hold the cans in close contact therewith to form a lateral mask for the coating application while the end abutting pattern of the cans provides for mutual end masking whereby uniform stripes are formed on the cans without the coating material reaching other interior or exterior portions of the cans.

With reference to the drawings a coating mechanism in a preferred or exemplary embodiment is shown comprising a spray or coating table 2, having a spray or coating station 4, and a can feeding device 6 which feeds the cans past the spray station.

Coating table 2 has a frame or base 8 which supports suitable guide rails 10, 12 (FIGS. 2 and 3) in a horizontal plane. The guide rails 10, 12 are spaced apart a distance which is defined as being slightly greater than the width of the side seam to be coated. The guide rails 10, 12 act as positioning devices for a pair of endless nonmagnetic belts 14, 16, which are mounted for coaxial clockwise movement (as viewed in FIG. 1) about shafts 17, 19 by suitable pulley combinations 18, 20 as later described. Shafts 17, 19 are pivotally supported in bearing blocks 22, 24, respectively which are carried by the base 8 of the spray mechanism.

The nonmagnetic belts 14, 16 are preferably formed from stainless steel and are of ribbon thickness for flexure about the guide pulleys 18, 20, and wide enough when acting with the hereinafter described apparatus, to define accurately an interbelt space which is exactly equal to the width of the side seam stripe to be coated.

In order to maintain the required interbelt space, the belts 14, 16 are guided in their coaxial movement by outer edges or shoulders 26, 28 of the guide rails 10, 12 (FIG. 3), acting in conjunction with guide grooves in the pulley combinations 18, 20. More specifically each of the pulley combinations 18, 20 comprise respectively, a pair of pulleys e.g. 18a, 18b (FIG. 4), pinned, keyed or otherwise coaxially mounted on shaft 17 in axially displaced relationship; while the pulley combination 20 is similarly mounted on shaft 19. Each pulley is provided with a peripheral groove, e.g. 21a, 21b (FIG. 4), on pulleys 18a, 18b, respectively, for accommodating and guiding its corresponding belt 14, 16. Accordingly, the combination of the peripheral grooves in the pulley combinations 18, 20, acting in conjunction with the outer edges 26, 28 of the guide rails 10, 12 guides the movement of the belts 14, 16 in displaced coaxial alignment.

The endless belts 14, 16 are a part of the can feeding device 6 which actually comprises two aligned portions, namely, a semi-positive drive element 30 (FIG. 1), and an impositive drive element 32. For the purpose of definition, the term semi-positive means a positive driving mechanism which will slip only when its positive action is blocked, while the term impositive means a frictional drive which never positively drives and which is subservient to the semi-positive drive element 30.

In order to fix the perspective for a description of the driving device 6, it is reiterated that one of the objects of this invention is to move the cans in end abutting or stovepipe relation across the coating station 4 on spray table 2. This objective is accomplished by driving the cans via the semi-positive drive element 30 onto the

aligned impositive drive element 32 at a greater rate than they are carried away by the impositive drive element 32. In this fashion—and assuming the cans are fed seriatim by the semi-positive drive element 30, at a controllable rate—each can fed by the semi-positive device will strike the can previously supplied to the impositive driving device, thereby causing the cans to form end abutting coaxial, stovepipe pattern on the impositive driving device, in a manner that will be described in detail.

In a preferred embodiment, the semi-positive driving device 30, comprises a chain 35, mounted about suitable shaft supported sprockets 37, 39, 41. Sprockets 37 and 39 are freely supported about shafts 43, 17 respectively (FIG. 1) while sprocket 41 is keyed or otherwise secured to shaft 45 which in turn is illustrated schematically as being driven by a motor 47 having suitable speed controlling attachments.

The links of the chain 35 are each equipped with a radially extending permanent magnet 48, which, during a portion of the chain travel, e.g. from sprocket 37 clockwise to sprocket 41, grip the cans supplied to the coating device (by some external means not shown) and transport them positively onto the endless belts 14, 16. The latter are driven by the impositive driving device 32 which comprises a motor 49 and suitable equipment for driving the shaft 19, as schematically illustrated in FIG. 1.

It will be noted (FIGS. 2 and 4) that sprockets 37, 41 are located in the space between, and slightly below, the upper peripheral bound of the endless belts 14, 16 and accordingly the radially extending magnets 48 of chain 35 act to move the cans tangentially onto the belts 14, 16. It can be recognized that the semi-positive drive 30 and the impositive drive 32 are partially overlapped (as viewed in FIG. 1) and in alignment (as viewed in FIG. 2). For purpose of definition then, this arrangement of the drives will be called partially overlapping alignment. More specifically, the magnets 48 move the cans onto the belts 14, 16 at the upper peripheral limit of the pulley combination 18 and then positively feed the cans relative to the belts 14, 16, to a point where the contour of sprocket 41, causes the magnets 48, to be broken away from the cans. This action, since the cans are fed onto belts 14, 16 at a greater rate than they are carried away, combines the positive driving action of the magnets with the frictional driving force existing between the can and the belts 14, 16, so that the magnets actually drive all the cans on belts 14, 16 (in an end abutting stovepipe pattern) up to the point where the combined frictional force between the cans and belts 14, 16 is greater than the magnetic force between the cans and the magnets 48, at which point the positive driving force of the magnets terminates and slippage occurs between the cans and magnets. This driving mechanism 30 accordingly is termed semi-positive.

It has been stated above that one of the objects of this invention is to have the endless belts act as lateral masks for the side seam stripe which is to be coated. In order to accomplish this objective, the cans must be pulled down into tight engagement with the belts 14, 16 at the coating station to prevent leakage of the coating material under pressure. Accordingly, a plurality of permanent magnets 50 are mounted in contact with the guide rails 10, 12 on the underside of the belts 14, 16 respectively. More specifically, the magnets 50 are mounted (FIG. 3) between the guide rails 10, 12 and a corresponding support 51, 53 respectively. In this manner, the magnets are never in direct contact with the cans, but they do exert sufficient magnetic pull to attract the cans into close contact with the belts 14, 16 and thereby prevent lateral leakage of any coating material.

Since as described above, the cans are fed to coating station 4 in a stovepipe pattern, a continuous coating supply can be used, thereby saving the cost of a control mechanism that would be necessary if a cyclic coating supply were employed. Actually the coating is accom-

plished by forcing spray material, or paint, through a tube 58 into a spray nozzle 60 (FIG. 3), which projects the paint under pressure against the side seam of the can between the masking limits defined by the belts 14, 16. The excess paint at the spray station collects in chamber 62 and then is returned to the supply (not shown) through a return pipe 64. With this structure a continuous supply of paint is provided at the spray station for coating the endless seam of the stovepiped cans and excess paint is drained away and returned to the supply to prevent any paint overflow at the spray station.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. A device for coating the side seam of can bodies with a stripe of predetermined width comprising in combination continuous application means for coating an area wider than said stripe of predetermined width and a power driven can feed operable to provide a bilateral mask between said application means and said bodies for laterally defining the coating area of the side seam and simultaneously providing an end abutting can pattern for said cans in their travel relative to said application means, said can feed comprising impositive drive means having integral masking means for feeding said can bodies past said application means and a semi-positive drive means for supplying cans in end abutting relation on said impositive drive means.

2. An apparatus in accordance with claim 1 wherein magnetic elements are positioned in said device to cooperate with said impositive drive means to hold the cans in close contact therewith during side seam coating.

3. An improved apparatus for feeding cans in an end abutting pattern comprising a pair of endless belts, means driving the same across a reference point at a predetermined lineal speed in spaced apart coaxial relationship to define an interbelt space smaller than the can diameter for cradling the body portion of the can, and an endless loop having a plurality of radially extending magnets, drive means for said loop positioning same in a plane lying between the planes of said belts and in partially overlapping alignment therewith with said belts and said loop having at least one common locus to provide for a tangential alignment between said belts and said loop, and control means operable on said loop drive means for driving said loop at a rate to supply cans to said belts at a greater rate than they are transported by said belts.

4. A device for coating the side seam of cans comprising in combination a spray gun including means for supplying coating material thereto, a pair of endless non-magnetic belts, an endless chain having a plurality of radially extending magnets for attracting and carrying said cans, sprocket means mounting said chain for peripheral movement between said belts and in tangential alignment therewith at one point at least of their overlapping portions, controllable means driving said chain to supply cans to said belts at a greater rate than they are carried away by said belts, magnetic means for attracting said cans into close contact with said endless belts adjacent said spray gun, means positioning said spray gun to underlie said belts at a position where said magnetic means is operable to draw said cans into close contact with said belts, and means for conducting away excess coating material.

5. An apparatus for coating the side seams of cans with a stripe of predetermined width comprising in combination continuous application means for coating an area wider than said stripe of predetermined width, can feed means comprising a pair of endless belts having their adjacent edges parallel and spaced apart a distance equal

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to the width of the area to be coated and in close engagement with said cans on opposite sides of said seams, means driving the same relative to said application means at a predetermined lineal speed, and a semi-positive driving means in partially overlapping alignment with said belts for supplying cans in an end abutting pattern onto said belts, said semi-positive drive means comprising an endless chain having a plurality of radially extending magnets for attracting and carrying said cans, sprocket means mounting said chain for peripheral movement between said belts and in tangential alignment therewith at one point at least of their overlapping portions, and controllable means driving said chain at a rate to supply cans to said belts at a greater rate than they are carried away by said belts.

6. An apparatus for coating the side seams of cans with a stripe of predetermined width comprising in combination continuous application means for coating an area wider than said stripe of predetermined width, can feed means comprising a pair of endless belts having their adjacent edges parallel and spaced apart a distance equal to the width of the area to be coated and in engagement with said cans on opposite sides of said seams, magnetic means for attracting said cans into close contact with said endless belts at said application means, means driving said belts relative to said application means at a predetermined lineal speed, and a semi-positive driving means in partially overlapping alignment with said belts for supplying cans in an end abutting pattern onto said belts.

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7. A device for coating the side seam of cans with a stripe of predetermined width comprising in combination, can feed means for feeding said cans along a predetermined path in an end abutting pattern and with the side seams of the cans in axial alignment, said can feed means including a pair of parallel endless belts having their parallel adjacent edges spaced apart a distance equal to the width of the area to be coated, and means for urging said edges of the belts and the bodies of said abutting cans into close masking engagement on opposite sides of said side seams, continuous application means for coating an area wider than said stripe of predetermined width with application directed against said side seams across said space between the belts, whereby the width of the stripe across the seams is limited by said belts while the cans are being advanced along said path by said can feed means.

8. An apparatus in accordance with claim 7 wherein said continuous application means is a spray gun having its nozzle directed toward the side seams of the advancing cans and across the space between the parallel endless belts.

References Cited in the file of this patent

UNITED STATES PATENTS

958,741	Graham	May 24, 1910
2,322,221	Cereghino	June 22, 1943