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Novice et al.

[11] **3,842,793**

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[54] **NON JAMMING BAFFLED COATING HOOD**

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[73] Assignee: **Dart Industries Inc.,** Los Angeles, Calif.

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[52] **U.S. Cl.** ..... **118/4,** 98/115 SB, 118/326, 118/DIG. 7

[51] **Int. Cl.** **B05c 11/16**

[58] **Field of Search** ..... 118/4, 324, 8, 24, 326, 118/48, 634, DIG. 7; 134/48, 57 DL; 98/115 SB

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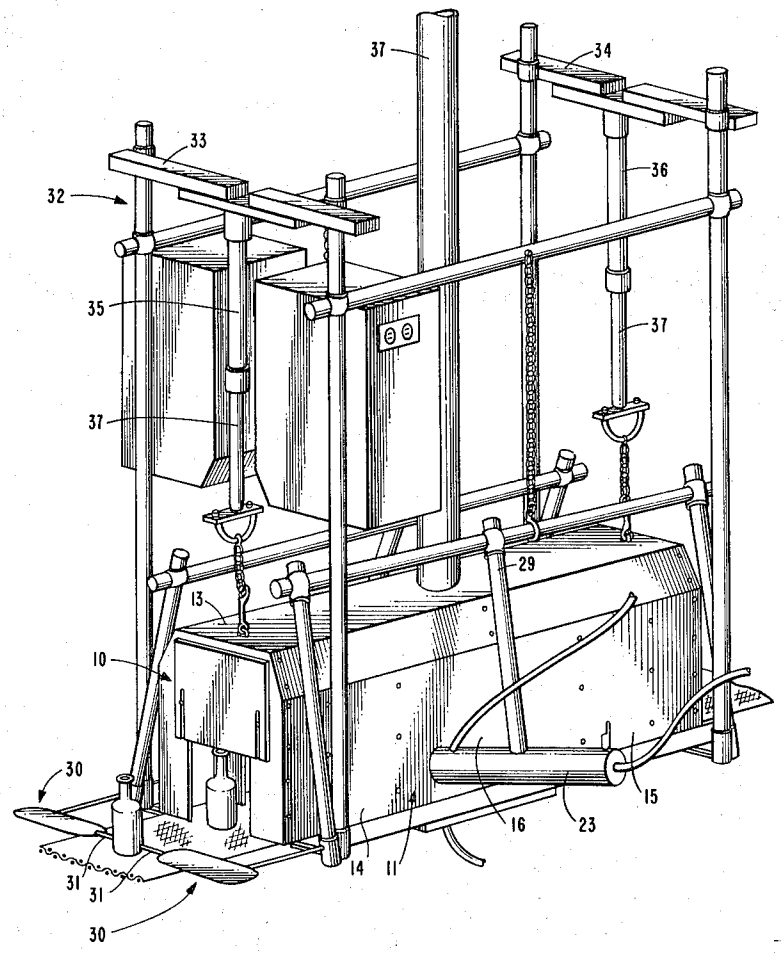
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Primary Examiner—John P. McIntosh

[57] **ABSTRACT**

The present invention relates to an automatically lifted hood for use at a coating station in a glass processing line. The hood of the invention is provided with baffling fins located in end sections of the hood, means for detecting downed or misaligned articles, an over the hood lift mechanism, side coating guns and an underbelt coating device.

15 Claims, 6 Drawing Figures



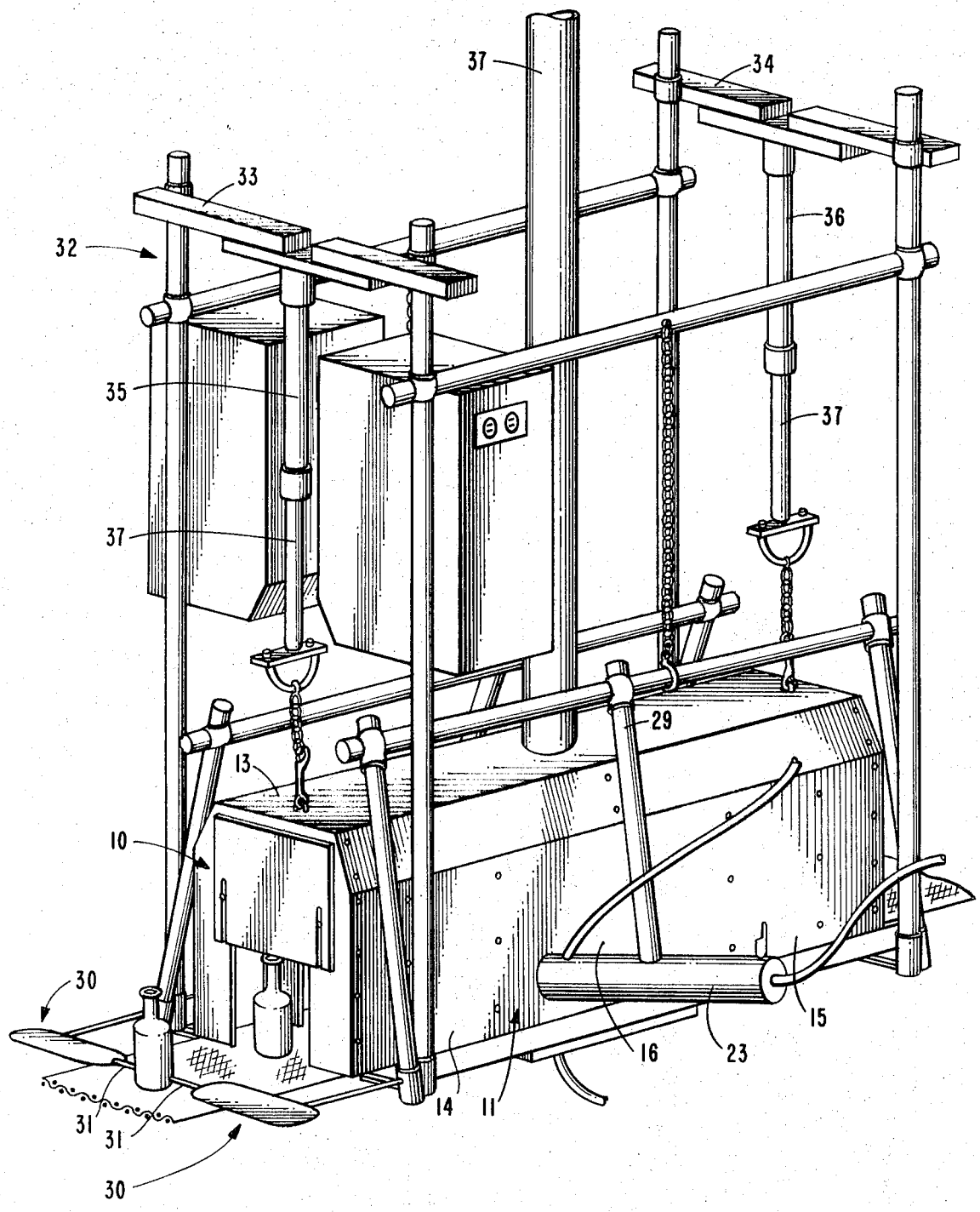
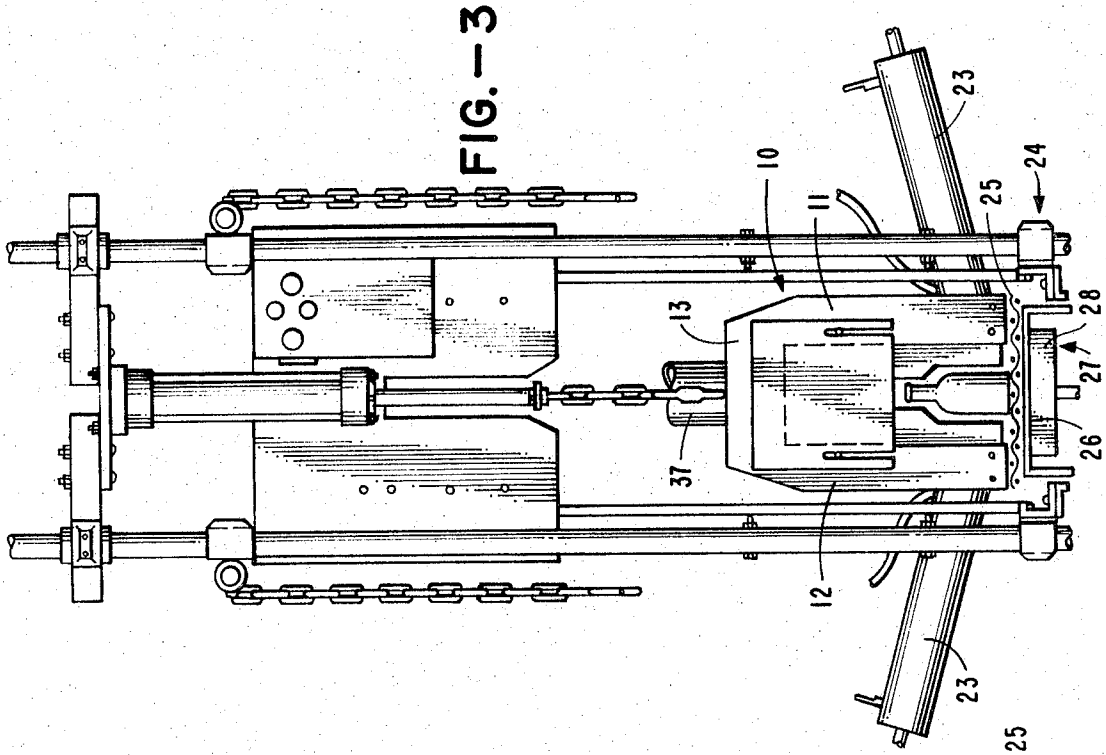


FIG. — 1

FIG.—3



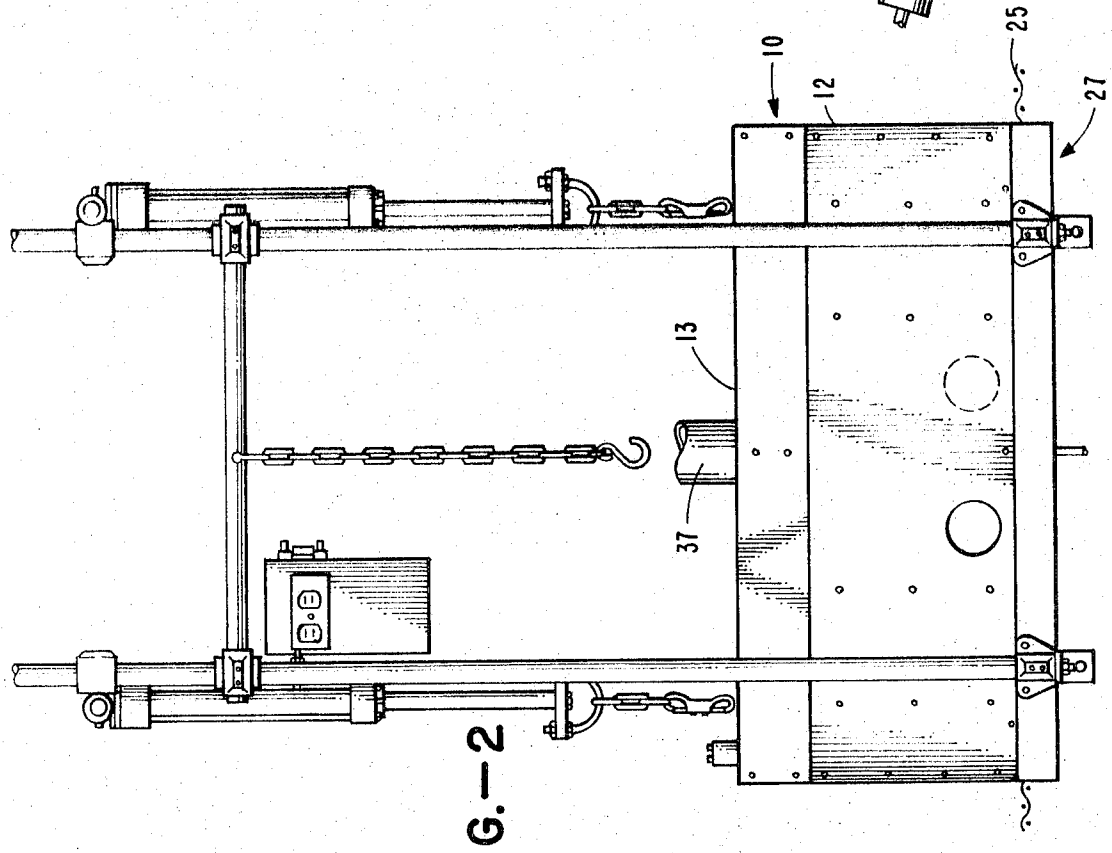


FIG.—2

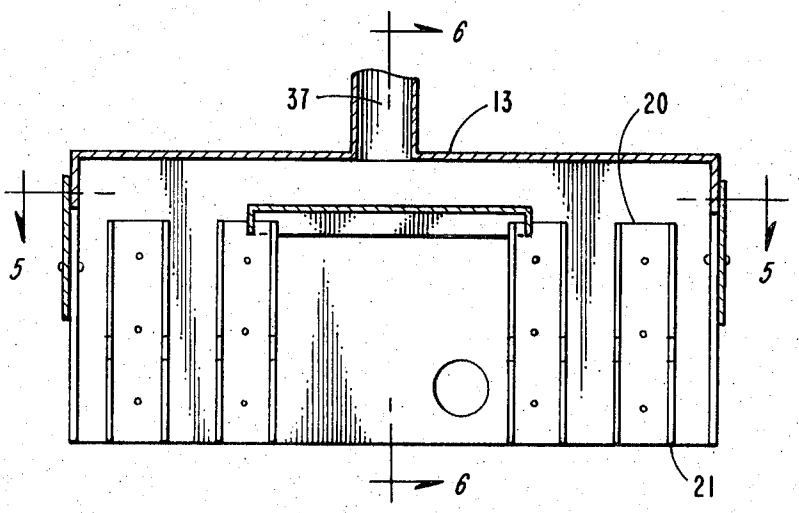


FIG. — 4

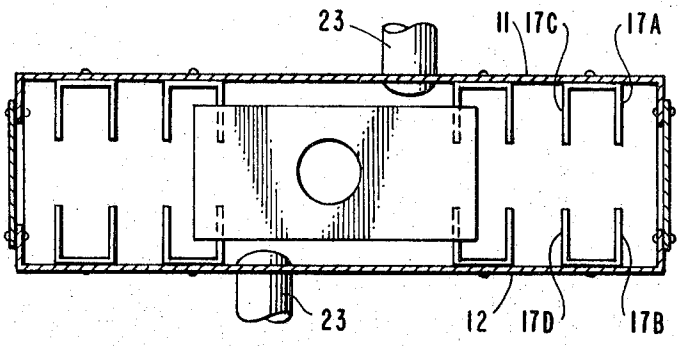


FIG. — 5

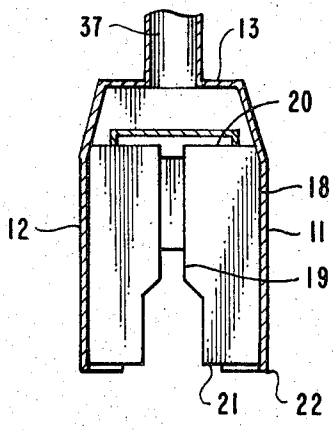


FIG. — 6

NON JAMMING BAFFLED COATING HOOD

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention concerns a hood for use at a coating station, the hood being adapted to prevent jamming due to misaligned or downed articles passing therethrough on a conveyor and also adapted to minimize fluid movement between an enclosed coating area and the environment surrounding the hood.

2. Description of the Prior Art

It is known in the prior art that hoods can frequently be used to remove unwanted gases, dispersions, dust, or heat by means of draft or vacuum systems. In the glass industry the more common uses for such hoods is to remove excess coating materials or vapors from coating materials from the atmosphere surrounding articles such as bottles on the conveyor which have been or are being coated.

Problems were, however, encountered in the prior art when hoods were placed over conveyors in that articles which became displaced with respect to their proper position on the conveyor would collide with the hood and become jammed in or against the hood and cause upstream articles to pile up against the jammed article. This jamming and piling up would cause time delays on the conveyor, would use valuable man hours in clearing the jam and would frequently cause damage to articles such as glass bottles on the conveyor.

The problem was partially alleviated when means were provided for raising the hood to facilitate clearing of of a jammed line. Such manually lifted hoods saved valuable man hours but it was still necessary to have a man watching the articles so that he could raise the hood when the articles began to jam in or against the hood. Later, automated systems were developed to stop processing, raise the hood or both to prevent the jam. These automated systems are fluid activated cylinder systems located about the conveyor rather than above it.

It is also known in the prior art that hoods can be used over conveyors to isolate vapors of coating materials from the surrounding environment. This is particularly important where coatings such as metallic halides are being applied since these materials and their reaction products are pollutants if they escape to the surrounding environment and may be damaging to the health of persons in the immediate vicinity.

To prevent escape of these vapors hoods have been provided with exhaust systems which operate under controlled conditions to remove the vapors and/or reactants as fast as new vapor is introduced. These systems work well in a controlled environment, but in a production line situation uncontrollable factors, such as air movement caused by typical factory operating conditions, may disturb the imput/exhaust balance and allow vapor to escape to the surrounding area. Likewise a gust of air may blow through the hood and dilute the vapor within which may result in unsatisfactory coating.

BRIEF DESCRIPTION OF THE INVENTION

In order to substantially reduce or eliminate the problem of jamming and piling up of articles against the hood, a device has been invented for automatically lifting the hood covering the conveyor when an article on the conveyor becomes displaced with respect to its proper orientation on the conveyor. A proper orientation or position is one which would permit the article to pass through the hood without striking any portion of the hood whereas an improper orientation or position of an article would permit the article to strike a portion of the hood if the hood were not moved from the path of the displaced article in the improper orientation or position.

The device comprises a means for detecting the displacement or improper position of the article, and lifting means for lifting the coating hood. The detecting means is connected to the lifting means so that when a displaced article is detected the lifting means is activated raising the hood out of the path of the article thus preventing the article from striking the hood, jamming and causing upstream articles to pile up against the jammed article. The apparatus thus almost completely eliminates time delays, loss of man hours clearing the jam and damage to articles on the conveyor.

The apparatus includes, in addition, guns each of which is fixed in moving relationship with the hood so that such coating guns and detecting means are raised and lowered when the hood is raised and/or lowered respectively.

The lifting means, unlike conventional hood lifters is located above the hood with only support means being affixed to the conveyor or other supporting structure at or below the level of the hood. This feature when coupled with the fixed relationship between hood, detecting means and side coating guns, virtually eliminates the possibility of jamming in that all structures which could be contacted by a misaligned or downed article and removed from the path of such article as soon as such an article is detected. In addition this feature of the invention facilitates clearing of any jam which may occur since there are virtually no offending structures in the way of the operator clearing the jam.

Finally, this feature makes it feasible to use an underbelt coating device exclusively or in addition to the side coating guns. Conventional hood lifting devices are generally not suitable for use with an underbelt coater since the channel under the hood is mounted with bulky air valves to effect lifting of the hood, such valves occupying space needed by the underbelt coaters.

The problem of minimizing fluid flow between the coating area under the hood and the environment surrounding the hood is substantially controlled by providing baffling fins on the inside of the hood. These fins are shaped in such a manner as to permit an article which is properly oriented on the conveyor below the hood to pass unobstructed while providing a minimum of space for fluid flow.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the apparatus of the preferred embodiment.

FIG. 2 is a side elevation view of the hood and lifting means.

FIG. 3 is an end elevation view of the hood and lifting means showing both side coating guns and underbelt coater.

FIG. 4 is a cross sectional view from the side of the hood alone.

FIG. 5 is a view taken in the direction of arrows 5—5 in FIG. 4.

FIG. 6 is an end view of the hood alone showing the structure of the fins in the hood.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawings it will be seen that a hood **10** is provided with imperforate side walls **11** and **12** and an imperforate top wall **13** extending between said sidewalls. The hood is provided functionally with three sections, opposite end sections **14** and **15** including end walls having appropriate openings to accomodate the passage of articles therethrough, and a central section **16,** defining a coating area within the hood. As best seen in FIGS. **3** and **4** a plurality of fins **17***a–d* are placed within the hood preferably within end sections **14** and **15.** In the preferred embodiment the fins are positioned within the hood at spaced invervals along the sidewalls thereof oriented substantially transverse to the plane of such sidewalls. Preferably a first side **18** of said fins abuts or is immediately adjacent to a sidewall of the hood. As may best be seen in FIGS. **4** and **5** the fins are preferably affixed to the sidewalls of the hood to prevent fluid movement between the first side **18** and the internal surface of the sidewall to which it is affixed. The first side **18,** therefore is preferably shaped to conform to the shape of the sidewall to which it is adjacent or affixed. The fins are preferably aligned along the sidewalls of the hood in which the end sections thereof in spaced pairs, fin **17***a* being directly opposite fin **17***b*, et cetera, as can best be seen in FIG. **4.** It is contemplated, however, that the fins need not directly oppose each other in that the spacing may be such that the fins on one side of the hood may be offset from a corresponding fin on the other side.

The fins are also provided with a second side **19,** which is located centrally of the sidewalls of the hood. Each said second side is shaped to approximately conform to the shape of an article which will pass between the fins as the article travels to and from the coating area. To permit passage of the article between such opposing or corresponding pairs of fins the second sides thereof are spaced apart a distance, at least, as great as the various diameters of the article.

As shown in FIG. **4** the fins are oriented perpendicularly to the sidewalls of the hood. It is contemplated, however, that this orientation may be varied somewhat preferably in the direction of movement of the article through the hood. By this slight variation in the orientation of the fins it will be possible to correct misalignment of articles which are only slightly out of a preferred alignment without causing a jam up of articles as they pass through the hood. Thus such an orientation will permit greater tolerances to be permitted in connection with the detector means which is hereinafter described whereby the hood is raised less frequently because of minor misalignment of articles.

The fins of the present invention are also provided with a top side **20** and a bottom side **21.** In the preferred embodiment the bottom side **21** is proximate the lower side **22** of the sidewalls **11** and **12.** In the preferred embodiment top side **20** of the fin extends upwardly a distance not less than the height of the article to be coated. Ideally it is preferable (although not shown in the drawing) for the top side **20** to be positioned immediately adjacent the top wall **13** of the hood to restrict passage of ambient air and/or vapor over the fins.

It is also contemplated that the fins may be pivotally attached within the hood, preferably to the sidewalls or top wall therof, permitting the fin to swing slightly if contacted by an article passing through the hood. If extremely lightweight fins are used the pivotally mounted hinge will pivot sufficiently to allow a misaligned bottle to pass without raising the hood.

The side and top walls of the hood are imperforate except for openings provided for exhaust means **37,** side coating guns **23** means for fastening fins thereto and openings for attachment of support/lifting means.

As best seen in FIGS. **1** and **2** hood **10** is positioned over a conveyor **24.** The conveyor comprises a perforate movable belt member **25** and a channel member **26** which in the preferred embodiment is perforate below the coating area defined by central section **16** of hood **10.** Thus in the preferred embodiment the hood may be advantageously used with the underbelt coater indicated generally by **27** in FIG. **2** and which is the subject of the application of Michael A. Novice, U.S. Ser. No. 280,376 (Dart Ref. 7938-M19) filed on even date herewith and entitled "Method and Apparatus For Underbelt Hot End Coating," to which reference is hereby made for details of the underbelt coater.

The perforate belt member **25** and the perforated portion of the channel member **24** thus communicate with distributor means **28** which is sealingly positioned below the conveyor and adapted to deliver coating material upwardly through the channel member **24** and the belt member **25** into the coating area defined by central section **16** of the hood. The underbelt coating device may be used as the exclusive means of coating or may be used in combination with one or more side coating guns **23.**

The hood of the present invention is also provided with at least one side coating gun **23** which may be used as the exclusive means of coating an article or which may be used in combination with the above described underbelt coater. In the preferred embodiment the side coating guns **23** are placed adjacent the central section **16** of the hood **10** and are adapted to deliver coating material into the coating area defined by said central section. The placement and/or point of delivery of the coating material may be varied to introduce coating material at different positions in the coating area.

In the preferred embodiment the side coating guns are affixed to the side wall **11** and to a structural member **29.** The side coating guns **23** are therefore preferably movable upwardly with the hood **10** when the hood is lifted so that the side coating guns are removed from the path of travel of downed or misaligned articles, thereby preventing jamming of such articles against a coating gun. In addition the raising of the coating guns with the hood also clears apparatus from the area of a jam or potential jams facilitating clearance of the area and saving valuable man hours in effecting clearance of any jam which might occur.

As seen in FIG. **4** the side coating guns **23** are in also connected to hood **10** so as to be upwardly movable therewith. Detecting means **30** It is understood, however, that they may be placed in opposition to each other at such points along the coating area as desired.

As may best be seen in FIG. **1** detecting means **30** are **9**Detecting means **30** is a means for detecting the presence of an article which is either downed or misaligned on the conveyor prior to its entry into the hood **10.** Accordingly, the detecting means **30** located upstream in

respect to the path of travel of the article on the conveyor and is provided with feelers **31** situated over the conveyor in such a manner as to define the path of travel for a properly aligned article. If a bottle is misaligned or downed it will contact the feeler **31** which will trigger appropriate circuitry (not shown) for activating the hood lifting mechanism, thereby causing the hood to be upwardly lifted for a sufficient time to allow the misaligned or downed article to pass under the hood without jamming.

The lift mechanism can also be triggered by the well known light/photocell arrangement, the electrical signal being derived from the interruption of the light beam by a misaligned bottle.

The hood is also provided with lifting means **32** adapted to impart vertical movement to the hood, the side coating guns **23** and the detecting means **30.** The lifting means **32** of the preferred embodiment is a supporting frame positioned at least partially above the hood **10.** Such supporting frame **32** is provided with fixed cross members **33** and **34** to which hood support members **35** and **36** are affixed in vertical alignment with a lower position of attachment on hood **10.**

In the preferred embodiment hood support members **35** and **36** are fluid activated piston/cylinder arrangements which are activated when a downed or misaligned article is detected on the conveyor. Upon activation these piston/cylinders fill with air causing piston rod to rise vertically thereby lifting the hood **10,** the detecting means **30** and the side gun coaters **23,** removing the same from the path of travel of the downed or misaligned article. Upon passage of the misaligned article the hood is returned to its coating position over the conveyor, conventional means being utilized to effect its timely return to this operative position.

We claim:

1. In a coating hood adapted to minimize fluid movement between an enclosed coating area and the environment surrounding same, said hood being provided with imperforate sidewalls, an imperforate top wall extending therebetween and opposite end sections including end walls having appropriate openings to accommodate the passage therethrough of articles to be coated and a central section defining a coating area, said hood further being movably positioned immediately above a conveyor for transporting articles thereto and therethrough and so positioned by lifting means located above and connected to the hood, said lifting means comprising a supporting frame member and a support means affixed to said hood such that vertical movement may be imparted thereto, said hood further including a plurality of fins positioned internally thereof and along the sidewalls of each section thereof, said fins extending inwardly from said sidewalls in a direction substantially transverse to such sidewalls.

2. The improvement claimed in claim **1** in which said hood is provided with at least one side coating gun affixed to said hood, said side coating gun being adapted to deliver a coating material to the coating area therein.

3. The improvement claimed in claim **1** in which said hood is positioned immediately above a conveyor for transporting articles therethrough, said conveyor comprising a perforate belt member and a perforate channel member each communicating with a distributor means sealingly positioned below said conveyor, said distributor means being adapted to deliver a coating material upwardly through said conveyor to the coating area in said hood.

4. The improvement claimed in claim **1** wherein said fins are aligned in opposing pairs along opposite sidewalls.

5. The improvement claimed in claim **1** wherein said fins are each provided with a first and second side and an upper and lower side, said first side being adjacent and conforming to the sidewalls of said hood, said second sides each being shaped to conform to the shape of an article to pass through this hood and between opposing fins.

6. The improvement claimed in claim **1** wherein the fins are pivotally mounted within the hood to permit passage of a downed or misaligned article without raising the hood.

7. The improvement claimed in claim **1** wherein said fins are affixed to said sidewalls.

8. The improvement claimed in claim **7** where said conveyor comprises a perforate belt member and a perforate channel member each communicating with distributor means sealingly positioned therebelow, said distributor means being adapted to deliver coating material upwardly through said conveyor to the coating area in said hood.

9. The improvement claimed in claim **8** wherein detecting means are affixed to said hood in such a manner as to detect a downed or misaligned article before said article reaches said hood, said detecting means being adapted to trigger an activating mechanism on contacting a downed or misaligned article causing activation of said lifting means thereby lifting said hood and said detecting means upwardly above the path of travel of a downed or misaligned article.

10. The improvement claimed in claim **9** in which at least one side coating gun is affixed to said hood and adapted to deliver coating material to the coating area therein.

11. The improvement claimed in claim **7** in which a detecting means is affixed to said hood in such manner as to detect a downed or misaligned article before said article reaches said hood, said detecting means being adapted to trigger an activating mechanism on contacting a downed or misaligned article causing activation of said lifting means thereby lifting said hood and said detecting means upwardly out of the path of travel of said downed or misaligned article.

12. The improvement claimed in claim **11** in which at least one side coating gun is affixed to said hood and adapted to deliver coating material to the coating area therein.

13. A vertically movable hood positioned over a conveyor for transporting articles therethrough, said hood being connected to lifting means comprising a supporting frame member located at least partially above said hood, a support member affixed to said hood and to a portion and said frame member above said hood and adapted to impart vertical movement to said hood, and detecting means affixed to said hood in such manner as to sense a downed or misaligned article before said article reaches said hood, said detecting means being adapted to trigger an activating mechanism on contacting a downed or misaligned article causing activation of said lifting means thereby lifting said hood and said detecting means upwardly out of a path of travel of said downed or misaligned article.

14. The apparatus claimed in claim 13 in which said conveyor comprises a perforate belt member and a perforate channel member each communicating with distributor means sealingly positioned therebelow, said distributor means being adapted to deliver coating material upwardly through said conveyor to a coating area in said hood.

15. The apparatus claimed in claim 13 in which at least one side coating gun is affixed to said hood and adapted to deliver coating material into a coating area therein.

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