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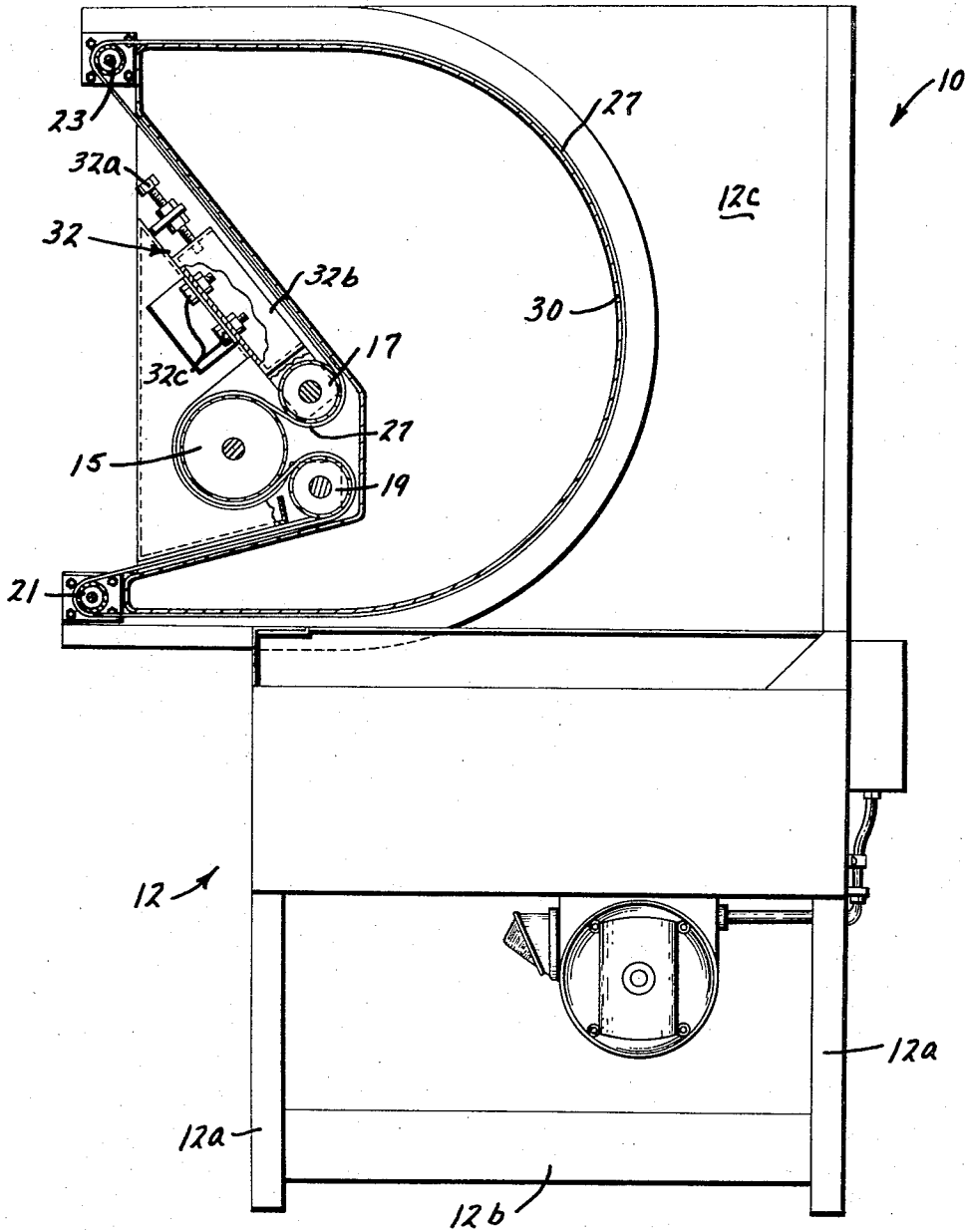
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ARTICLE TURNOVER APPARATUS

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3 Sheets-Sheet 1



**FIG. 1**

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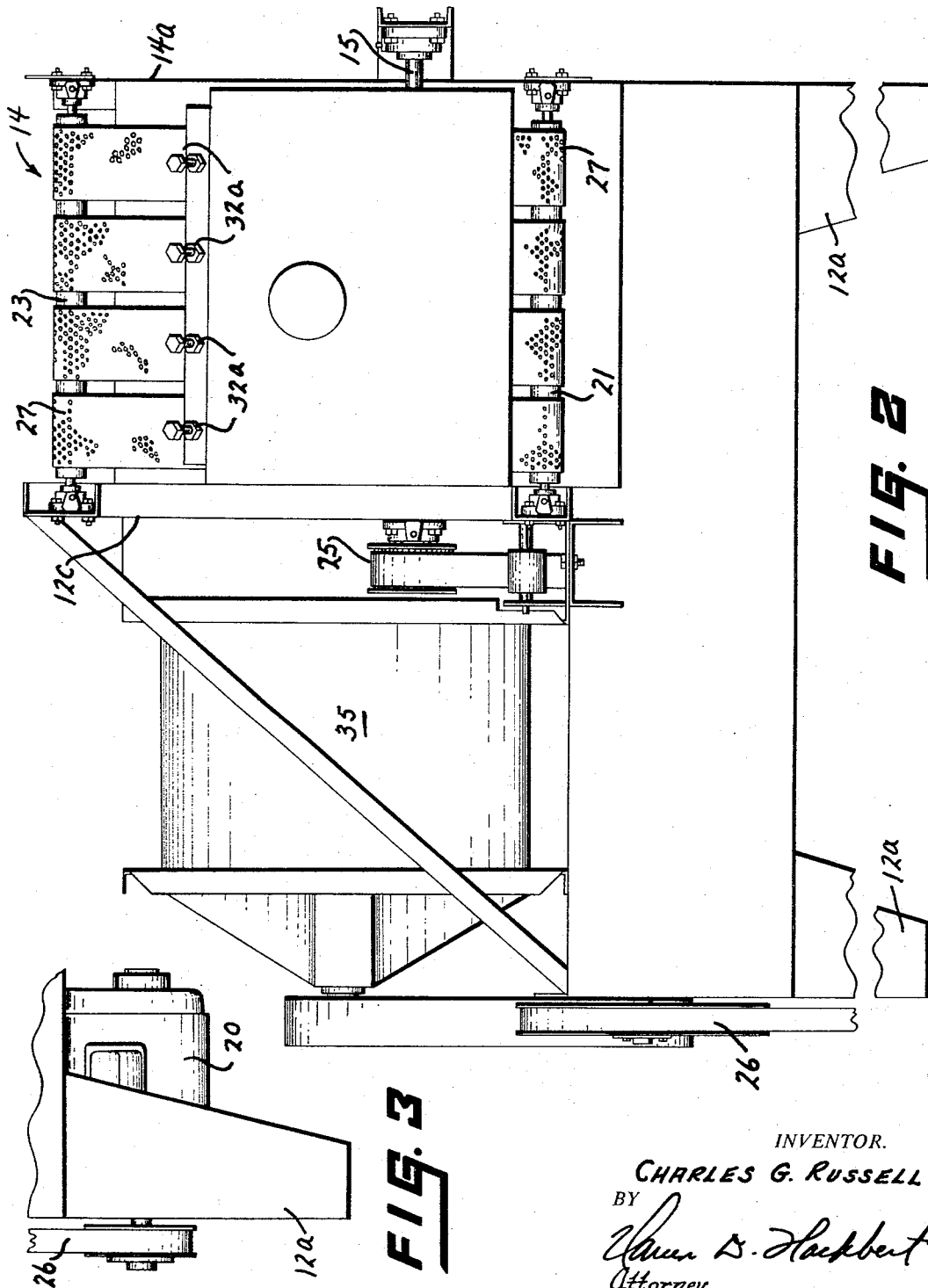
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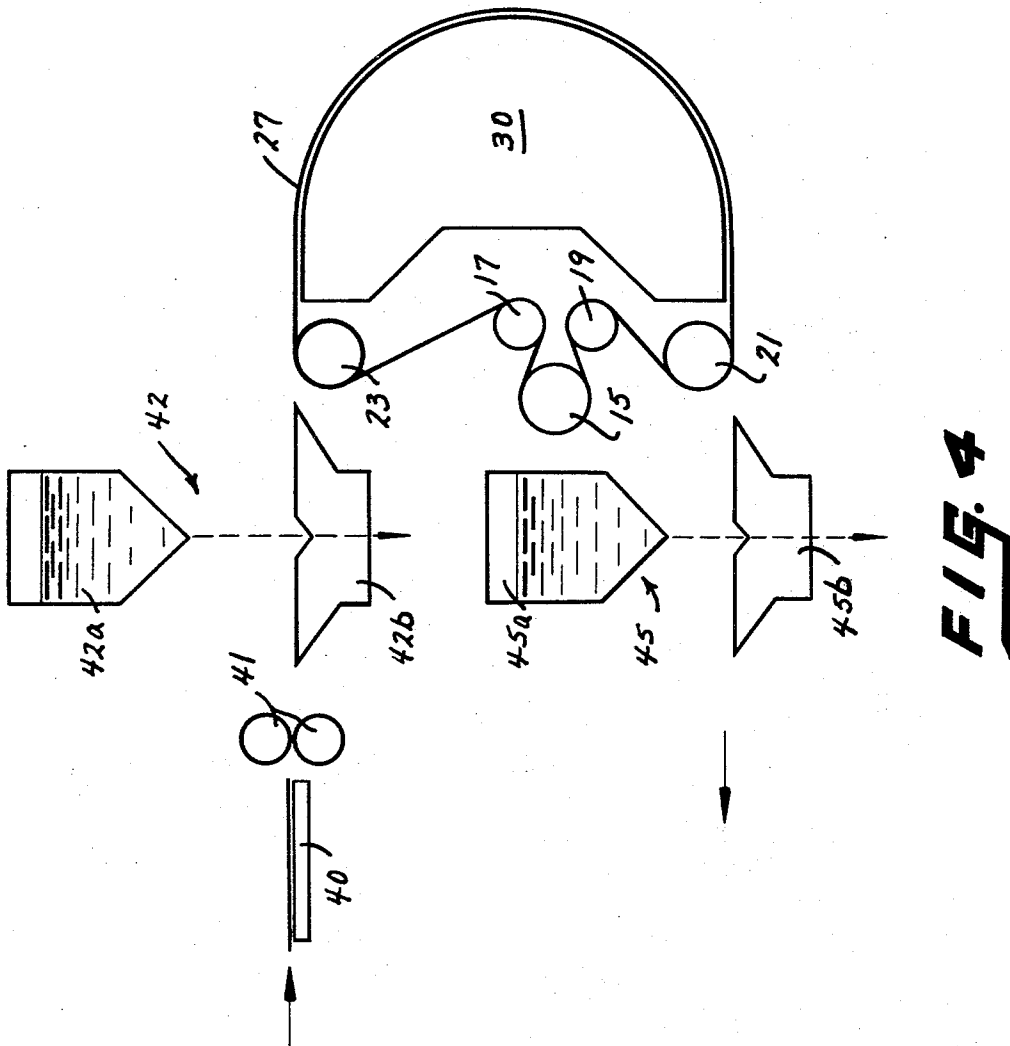
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3 Sheets-Sheet 3



**FIG. 4**

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**ARTICLE TURNOVER APPARATUS**

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2 Claims. (Cl. 118—62)

**ABSTRACT OF THE DISCLOSURE**

An article turnover apparatus characterized by perforated belts moving around a slotted stationary drum and including vacuum producing means for positioning the articles on the perforated belts for movement in a curved path for consecutive treatment of opposite surfaces.

The present invention relates to an article turnover apparatus, and more particularly to a new and novel structure for permitting the ready and automatic consecutive coating of opposite sides of an article such as paperboard, for example.

As is known, it is oftentimes desirable to coat opposite surfaces of sheeting, such as material used for carton blanks, to afford a liquid impervious finished article. In order to effectively accomplish such opposite surface coating, considering desirable manufacturing volume, it has become evident that a procedure other than the manual turning of segments of the material from one surface to another would be necessary. In other words, previously, in one operating method, the material was coated on one surface, manually turned over so that its other uncoated surface was revealed, and, thereafter, run through coating apparatus again to achieve the desired end characteristics.

By virtue of the instant invention, the applicant herein has invented a new and novel article turnover apparatus which automatically and effectively carries the material under process from a first to a second coating head for consecutive coating on opposite surfaces. Broadly, the invention comprises perforated belts moving around a slotted stationary drum, where the latter includes an exhaust blower which pulls a vacuum on the drum to position and move the articles being coated in a curved path between the first and second coating heads for consecutive opposite surface coating. The instant turnover apparatus represents simplicity and high effectiveness in operation, permitting sustained production operation with a minimum of maintenance, and, yet, a volume of production not possible heretofore.

Accordingly, the principal object of the present invention is to provide a new and novel article turnover apparatus.

Another object of the present invention is to provide a new and novel article turnover apparatus which effectively permits the automatic consecutive coating of opposite surfaces of an article in accordance with high production demands and, at the same time, affording desirable end results.

A further and more general object of the present invention is to provide a new and novel article turnover apparatus which is readily adaptable for use with virtually any coating system or arrangement, which is readily installed for effective production, which represents ease in assembly and manufacturing, and which is capable of sustained production operation with a minimum of maintenance.

Other objects and a better understanding of the present invention will become more apparent from the following description, taken in conjunction with the accompanying drawings, wherein

FIG. 1 is a view in side elevation, partly in cross-

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section for clarity, showing the applicant's new and novel article turnover apparatus;

FIG. 2 is another view in elevation of the turnover apparatus of FIG. 1;

FIG. 3 is a fragmentary view of a detail of FIG. 2, serving to amplify the latter; and,

FIG. 4 is a diagrammatical view of the instant invention utilized in conjunction with a typical curtain coater installation.

For the purposes of promoting an understanding of the principles of the invention, reference will now be made to the embodiment illustrated in the drawings and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such alterations and further modifications in the illustrated device, and such further applications of the principles of the invention as illustrated therein being contemplated as would normally occur to one skilled in the art to which the invention relates.

Referring now to the figures, the applicant's new and novel article turnover apparatus 10 typically comprises a framework 12 having legs 12a and reinforcing members 12b interconnecting such legs 12a. The article transfer portion 14 of the invention is disposed on a portion 12c of the aforesaid framework 12, which, together with a side member 14a, supports a drive roller 15, take-up rollers 17, an idler roller 19, and other idler rollers 21 and 23, each being conventionally positioned. The drive roller 15 is driven by a conventional power source 20 through, for example, shaft and belt and pulley drive arrangements 25 and 26.

As should be evident from FIGS. 1 and 2, a series of perforated flexible belts 27 extend in a path defined by idler roller 21, idler roller 19, drive roller 15, take-up rollers 17, idler roller 23, and over the curved outer surface of a drum 30, the latter having guides (not shown) which define the paths of travel of the aforesaid belts 27. Openings in the form of slots (also not shown) are disposed beneath each of the belts 27 for reasons which will become apparent from the discussion herebelow.

In order to tension any of the belts 27, and for positioning same for initial operation, a take-up mechanism 32 is provided for each take-up roller 17, where one of the latter operates with each of the belts 27. Each of the take-up mechanisms 32 is capable of movement, through threaded bolt 32a, to accomplish belt tensioning. As should be evident from FIG. 1, the take-up mechanism 32 each have a body 32b secured to a portion of the framework 12 through nut and bolts 32c, where slots in the body 32b (not shown) permit the aforesaid linear tensioning movement.

The remaining portion of the apparatus comprises an exhaust blower 35, also typically positioned on the framework 12, not being shown in detail, however, because same is conventional in structure and operation. In this regard, and typically, with the operation of the exhaust blower 35, a vacuum or suction results within the drum 30, through air paths principally including the perforations in each of the belts 27, the aforesaid openings or slots in the drum 30, any connecting conduit to the blower 35, and from the discharge of the latter. In other words, when in operation, the articles under processing are retained by vacuum on the belts 27 in passing around the outer curvature of the drum 30 to effect turnover.

In this latter regard, and with reference to FIG. 4, a typical installation might include an article feeding surface 40, followed by feed rollers 41, which moves the article, such as paperboard, for example, through a curtain coater apparatus 42. After coating material is disposed on one surface of the article from the reservoir 42a, the coating material overflow passing into a return trough

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42b, the article moves onto, and is positioned on, the perforated belts 27 of the instant turnover apparatus 10, following a curved path due to the suction or vacuum created by the blower 35. In other words, the articles under process, even if flat, are caused to remain in effective position on the belts 27 throughout their path of travel, the latter traveling time even serving for drying purposes, if necessary or desired.

Thereafter, when the article reaches the bottom of the path of travel i.e. proximate the idler roller 21, it is released by lack of vacuum and readily passed through another curtain coater apparatus 45, the latter serving to effectively coat the opposite side of the article from the reservoir 45a, where, again, a return trough 45b is provided for excess coating material.

In a typical installation for coating blanks for milk cartons, for example, high viscosity wax-resin blends are readily used, where, and by way of illustration, the apparatus may be caused to operate up to 1200 feet per minute for attaining high production standards. It should be evident that the instant turnover apparatus 10 may have applications other than for the coating the opposite surfaces of an article, as, for example, wherever turning from one surface to another is desired for any ultimate end purpose.

As a matter of further illustration, by using a dryer in combination with the instant turnover apparatus, a solvent material could be caused to dry as an efficient part of the turning operation. Moreover, different glosses may be applied, as for example, to achieve a shiny characteristic on one surface, and a paraffin characteristic on the opposite surface. Additionally, the articles under process could be chilled, as well as heated, all of the preceding indicating the ready adaptability of the instant invention for numerous applications and specialized situations.

Accordingly, it should be evident from the above that the applicant herein has afforded a new and novel article turnover mechanism; however, the apparatus described is, of course, susceptible to various changes within the spirit of the invention. For example, the number of perforated

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belts may be varied; the perforations and/or openings per se made to assume different configurations, i.e. rectangular, in line, and/or staggered; a shorter or even partial radius drum could be employed for a custom installation; and, proportioning varied, all with the same important end results. Thus, the above description should be considered illustrative and not as limiting the scope of the following claims:

I claim:

1. In combination with a first curtain coater and a second curtain coater, a turnover apparatus for a flat article which receives said flat article after one surface thereof has been coated comprising a fixed drum having a plurality of openings in a curved portion thereof, perforated flexible belts traveling on said fixed drum in generally parallel paths which overlie said openings, and means creating a vacuum within said fixed drum to position the uncoated surface of said flat article on said flexible belts by vacuum in a path including said openings in said fixed drum and said perforated flexible belts to invert said flat article for coating the opposite surface thereof by said second curtain coater after release from said position on said flexible belts upon passing the vacuum zone.

2. The apparatus of claim 1 where said flexible belts travel in a path having a return for permitting the release of said flat article.

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