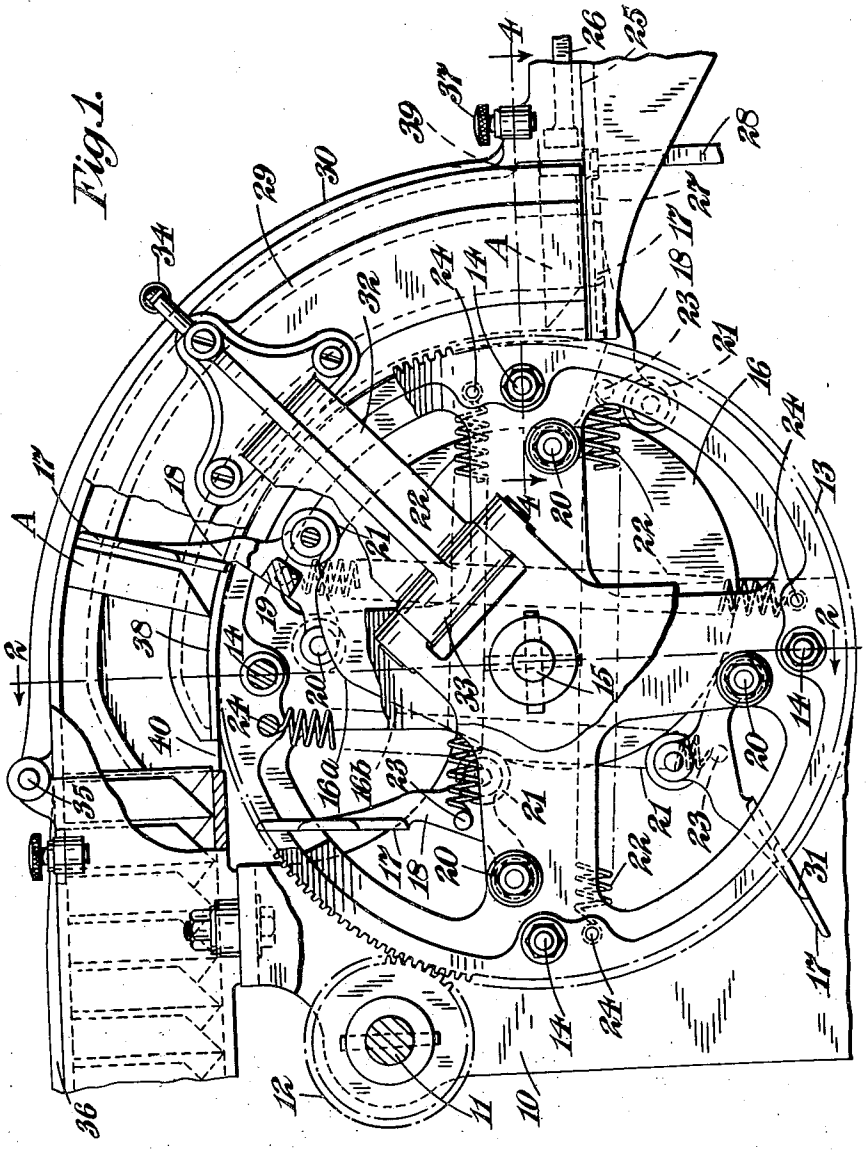
Sept. 25, 1934. A. G. ROSE 1,974,931

CONVEYING MECHANISM

Filed March 2, 1934 4 Sheets-Sheet 1

Fig. 1.



INVENTOR

Alfred German Rose

by his attorneys

Byrnes, Stebbins & Blenko

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CONVEYING MECHANISM

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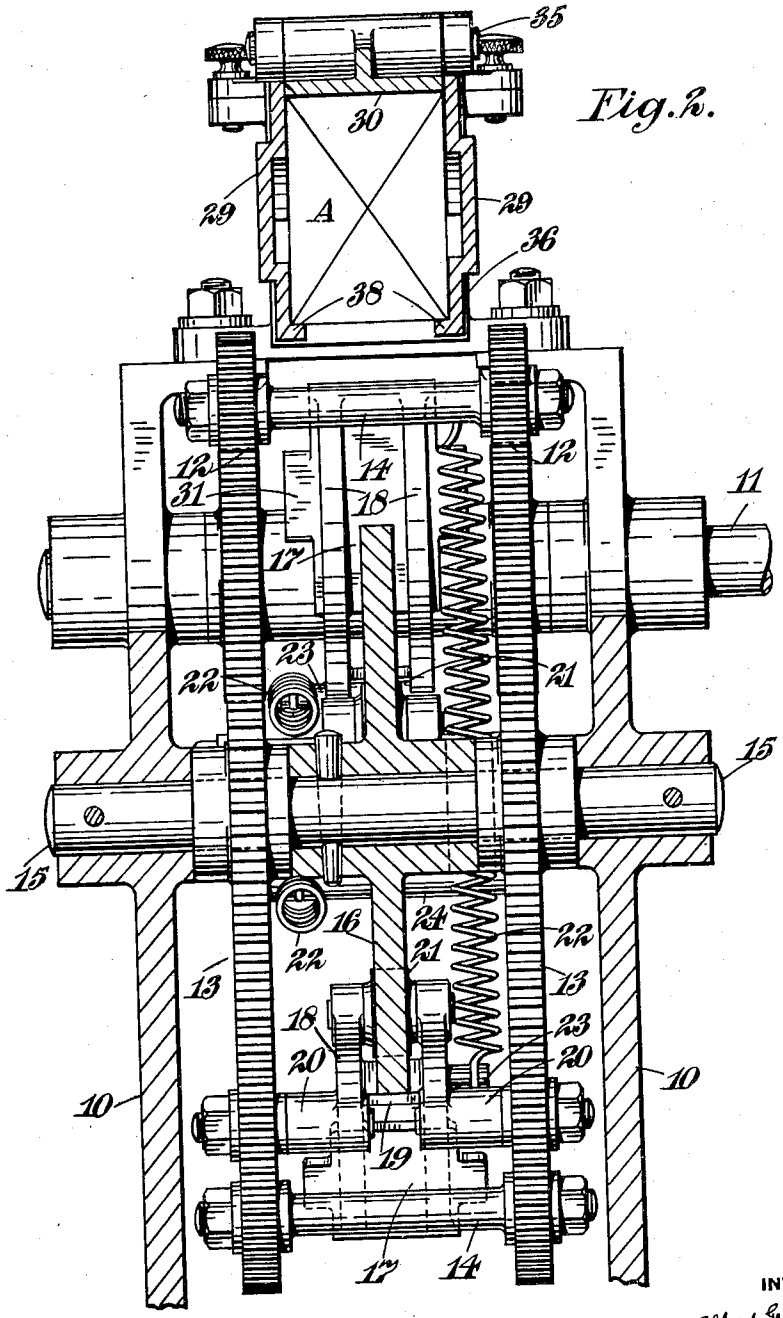

Fig. 2.

INVENTOR
Alfred German Rose
by his attorneys
Byrnes, Stebbins & Blenko

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CONVEYING MECHANISM

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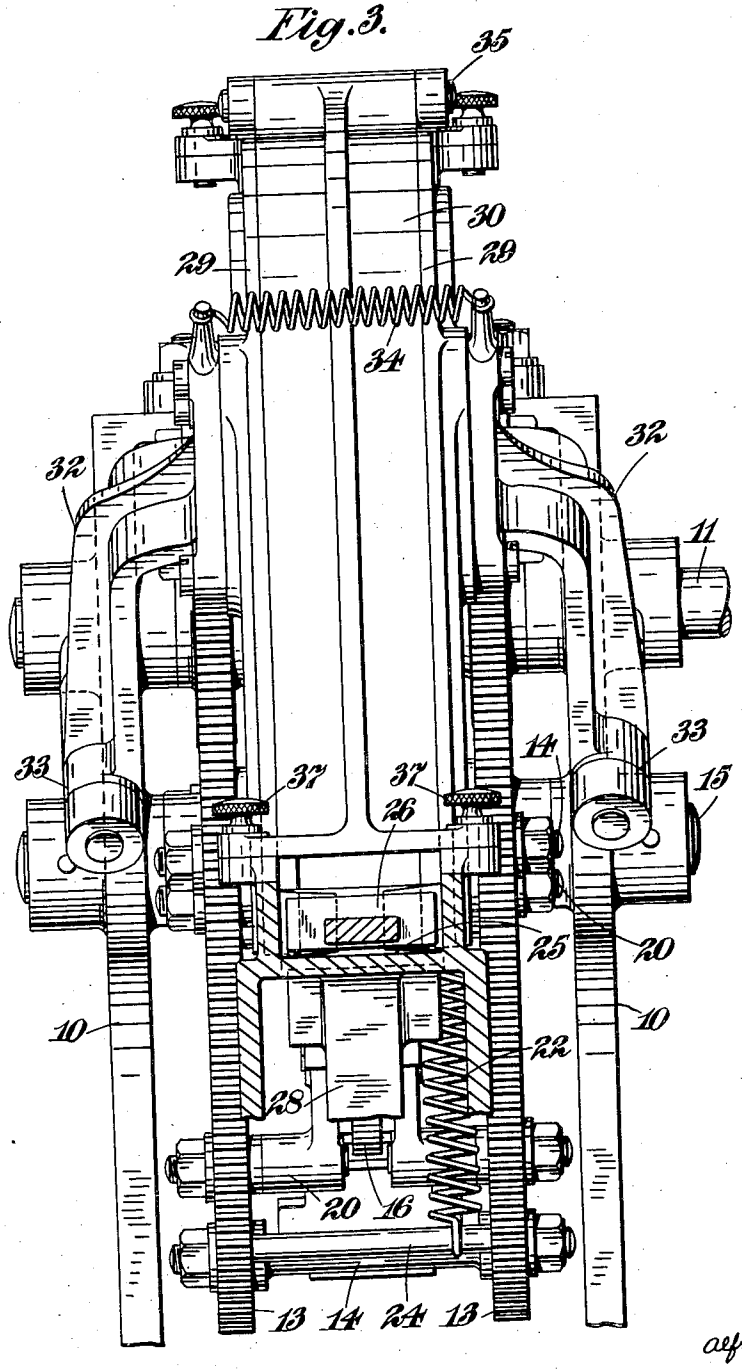
Fig. 3.



INVENTOR
Alfred Gorman Rose
by his attorneys
Byrnes, Stebbins & Blenko

Sept. 25, 1934. A. G. ROSE 1,974,931

CONVEYING MECHANISM

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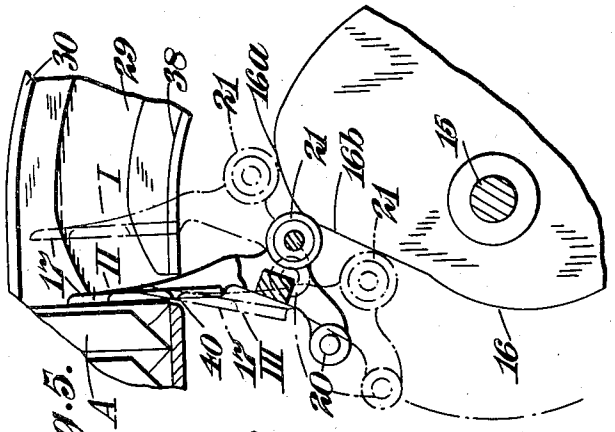

Fig. 5.

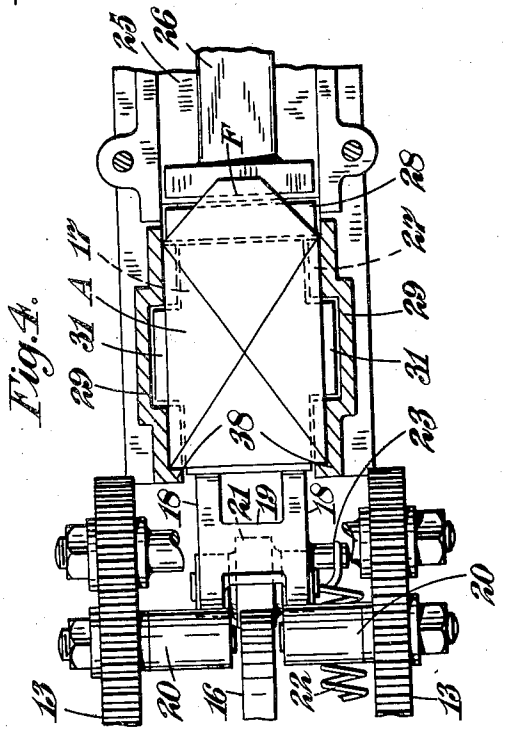

Fig. 4.

INVENTOR

Alfred German Rose

by his attorneys

Byrnes, Stebbins & Blenko

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UNITED STATES PATENT OFFICE

1,974,931

CONVEYING MECHANISM

Alfred German Rose, Gainsborough, England, assignor to Rose Brothers (Gainsborough) Limited, Gainsborough, England, a British company

Application March 2, 1934, Serial No. 713,662
In Great Britain January 25, 1933

10 Claims. (Cl. 198—27)

This invention relates to mechanism for conveying a series of articles one by one from one station to another and is applicable to mechanism for conveying, in a packet-making machine, a succession of packets one by one from a wrapping and gumming mechanism to a drying chamber wherein the packets are assembled in a row and the adhesive used to close them is dried.

According to the present invention the conveying mechanism comprises a wheel rotatable in one direction, one or more conveying members pivoted on the wheel to move therewith in a circular path passing through the two stations and each arranged to engage an article at the receiving station and move it along said path to the delivery station, and a cam co-operating with the conveying members to rock each of them, at the delivery station, relatively to the wheel in the reverse direction to the direction of rotation of the wheel and cause its operative part to move transversely of said path and clear of the article.

According to a feature of this invention, there is provided, at the delivery station, a track that is tangential to the circular path and the cam is so formed as to rock each conveying member, as the article enters the track, backwardly relatively to the wheel at the same angular velocity as it rotates with the wheel, whereby it has no absolute rotational movement but moves parallel to itself along a path inclined to the length of the track.

With this arrangement the conveying member slides over the rear surface of the article, without tilting, as it pushes the article on to the track. Preferably, the conveying member is disengaged from the article after the latter has fully entered the track by being rocked backwardly at a higher velocity so that its operative part has a backward component of movement along the track and relatively to the wheel substantially equal to its forward component of movement along the track with the wheel and thus moves transversely of the track and rocks but has no substantial forward movement along the track.

Conveniently there are provided walls, which may be pivotally mounted so that they can be moved apart to give access to the place they enclose, which walls form a track enclosing the circular path followed by the articles so as to guide and constrain them.

A preferred construction of conveying mechanism, as applied to a packet-forming machine, will now be described, by way of example only, with reference to the accompanying drawings in which:—

Figure 1 is a side elevation of the conveying mechanism and adjacent parts. Certain parts have been broken away in order to show the construction.

Figure 2 is a section on the line 2—2 of Figure 1.

Figure 3 is an end elevation of the apparatus as seen from the right of Figure 1.

Figure 4 is a section on the line 4—4 of Figure 1, and

Figure 5 is a diagram showing parts of the mechanism in different positions.

Like reference characters indicate like parts in all the figures of the drawings.

The mechanism is supported by a frame 10 in which is rotatably journalled a shaft 11. This shaft is constantly driven in any suitable manner and has two pinions 12 pinned on it. These pinions mesh respectively with two gear wheels 13 which are secured together by bolts 14 and are rotatably mounted on a shaft 15. The shaft 15 is supported in the frame 10 to which it is pinned. A stationary cam 16 is pinned on the shaft 15 between the gear wheels 13. It will be seen that the gear wheels 13 rotate continuously during the operation of the machine.

The wheels 13 carry four conveying members which each comprise a plate 17 formed integral with a pair of arms 18 which are braced together by a member 19 (see Figures 1 and 4). The conveying members are pivoted at 20 on the wheels, the pivots 20 being arranged on a circle concentric with the axis of the shaft 15. Each conveying member also carries a roller 21 pivoted between its pair of arms 18 and co-operating with the cam 16. The rollers 21 are held against the cam by springs 22 each anchored at one end to a pin 23 of the respective conveying member and at the other end to a separate rod 24 which extends between the two wheels (see Figures 2 and 4). As shown in Figure 1, the springs are arranged in two pairs and one pair lies on one side of the cam while the other pair lies on the other side of the cam.

Articles A are fed from the wrapping and gumming mechanism along a track 25 by a pusher 26. This pusher delivers each article on to rails 27. By this time the article has been fully wrapped except for upper and lower flaps F (Figure 4). The lower flap is closed in a known manner by a suitable folding member 28 which is reciprocated by suitable mechanism (not shown). This folding operation takes place after the plunger 26 has withdrawn.

After the lower flap has been folded the article is engaged by the plate 17 of one of the conveying members which conveys the article along

a quarter-circular track enclosed by two side members 29 and a top member 30. As shown in Figure 4, each plate 17 is, at its ends, of less width than the packet but is provided with two extensions 31 which extend beyond the centre of the packet. The side walls 29 are shaped so as to embrace the packets closely near its two ends but to accommodate the extension 31. The side walls 29 are formed with ledges 38 to support the inner surface of the article and guide the article as it is conveyed around by the conveying mechanism.

As shown in Figures 1 and 3, each side wall 29 is secured to a separate arm 32 which is pivoted at 33 in frame 10 of the mechanism. The side walls are held together and against the side surfaces of the top wall 30 by a spring 34. The top wall 30 is pivoted at 35 on the top of a drying chamber 36 which is secured on top of the frame 10. The top wall 30 is held in position by means of screws and nuts 37. It will be seen that this arrangement allows of the top and side walls being swung outwardly to give access to the space they enclose.

As shown in Figure 1, the cam 16 is formed with a portion adjacent the receiving station (where the articles are delivered by the plunger 26) which is so shaped that, as the roller 21 of a conveying member passes over it, that member is rocked slightly clockwise at an angular velocity equal to the angular velocity with which it rotates anti-clockwise with the wheel. The plate 17 of this member will therefore move parallel to itself as it engages the article and lifts it from the rails 27 into the track enclosed by the walls 29 and 30. As the article is lifted the upper flap F is engaged by a rounded corner 39 of the top wall 30 and folded down against the packet. After this has occurred the roller 21 of the conveying member engages a circular concentric portion of the cam so that the article is conveyed along the circular track enclosed by the walls 29 and 30 through an angle of 90°. During this time the plate 17 extends substantially radially of the wheels 13.

Referring to Figure 1, it will be seen that the walls 29 and 30 are so shaped that they guide the article along a circular path until it is vertically above the shaft 15 and thereafter guide it along a short path tangential to its previous circular path. The tangential portion of this path is a continuation of the drying chamber which is formed as a horizontal rectangular tunnel in a known manner. As the article passes through the position vertically above the shaft 15 the roller 21 on the associated conveying member engages a portion 16*a* of the cam. This portion is so shaped that the conveying member is rocked backwardly relatively to the wheels 13 at the same angular velocity as it is rotating forwardly with those wheels. The plate 17 of this conveying member will therefore be moved parallel to itself inwardly in respect to the wheels 13. The conveying member thus pushes the article into the drying chamber 36 and at the same time moves transversely of it, the plate 17 sliding over the rear surface of the article. In Figure 5 an intermediate position is shown in chain line at I, while the position of the parts when the article has fully entered the drying chamber is shown in full lines at II.

When the conveying member has reached the position II, its roller 21 engages a portion 16*b* of the cam which is so shaped that the conveying member rocks rearwardly, or clockwise, at a higher angular velocity than it is rotating forwardly or counter-clockwise, with the wheels 13. The arrangement is such that the plate 17 will have no substantial forward movement as the roller 21 passes over the cam portion 16*b* but moves transversely of the packet through a suitable opening 40 until it is clear of the packet and of the drying chamber. After this latter has occured the cam gradually rocks the conveying member back to the position it assumed prior to picking up an article. It will be appreciated that as each article is delivered to the drying chamber all the articles already in that chamber are pushed along one step.

The top of the drying chamber may be made so that it can be removed in a known manner to give access to the articles it contains. Suitable heating means may be provided in the drying chamber in a known manner. Heating means may also be provided on the side walls 29 and/or the top walls 30 for the purpose of drying the gum or other adhesive by which the folded portions of the wrapper are secured as an article passes along the path formed by the walls 29 and 30.

I claim:

1. Mechanism for conveying articles from one station to another comprising a wheel rotatable in one direction, a conveying member pivoted on the wheel to move therewith in a circular path passing through the two stations and a cam co-operating with the conveying member to rock it, at the delivery station, relatively to the wheel in the reverse direction to the direction of rotation of the wheel and cause its operative part to move transversely of said path.

2. Mechanism for conveying articles from one station to another comprising a wheel rotatable in one direction, a plurality of conveying members pivoted on the wheel to move therewith in a circular path passing through the two stations, and a stationary cam co-operating with the conveying members to rock each of them, as it passes through the delivery station, relatively to the wheel in the reverse direction to the direction of rotation of the wheel whereby the operative part of the conveying member is moved transversely of said path.

3. Mechanism for conveying articles from one station to another comprising a wheel rotatable in one direction, a conveying member pivoted on the wheel to move therewith in a circular path, means for feeding an article into said path and in front of the conveying member, a track tangential to said path into which the article is moved by the conveying member and a cam co-operating with the conveying member to rock it relatively to the wheel, when the article enters said track, in the reverse direction to the direction of rotation of the wheel whereby the operative part of the conveying member is caused to move parallel to itself and transversely of its circular path at the delivery station.

4. Mechanism for conveying articles from one station to another comprising a wheel rotatable in one direction, a conveying member pivoted on the wheel to move therewith in a circular path, means for feeding an article into position to be engaged by the conveying member and moved along the path, a delivery track tangential to said circular path and a cam shaped to prevent movement of the conveying member relatively to the wheel as the article is moved along said path and also shaped to cause the conveying member to rock relatively to the wheel in the reverse direction to the direction of rotation

of the wheel and at the same angular velocity as it rotates with the wheel when it is moving the article into the track.

5. Mechanism for conveying articles from one station to another comprising a wheel rotatable in one direction, a conveying member pivoted on the wheel and having an operative portion normally positioned outside the circular path followed by its pivot on the wheel, means for feeding an article into position to be engaged by the operative part of the conveying member, means for guiding said article along a circular track followed by the conveying member, article-receiving means forming a track tangential to said guiding means and a cam co-operating with the conveying member to rock it, as the article enters said receiving means, in the reverse direction to the direction of rotation of the wheel and at an angular velocity equal to the angular velocity with which the conveying member rotates with the wheel about its pivot on the wheel.

6. Mechanism for conveying articles from one station to another comprising a wheel rotatable in one direction, a conveying member pivoted on the wheel and having an operative part more distant from the axis of rotation of the wheel than the point at which it is pivoted to the wheel, means for feeding an article into position to be engaged by the operative part of the conveying member, means for constraining the article to move along a part-circular path with the conveying member, receiving means into which the article is delivered by the conveying member in a direction tangential to the circular path, and a cam co-operating with the conveying member to restrain it from rocking relatively to the wheel as it passes along said circular path and then to cause it to rock relatively to the wheel and in the reverse direction to the direction of rotation of the wheel as it delivers the article into the receiving means, which cam first rocks the conveying member at the same angular velocity as that member rotates with the wheel and then rocks it at a higher angular velocity.

7. Mechanism for conveying articles from one station to another comprising a wheel rotatable in one direction, a conveying member pivoted on the wheel to move therewith in a circular path, means for delivering an article into said path, a receiving device having an opening located in said path to receive an article fed along said path by the conveying member, and a stationary cam co-operating with said member to cause it to rock backwardly relatively to the wheel as it passes the delivering means and as it passes the opening into the receiving means, the angular velocity of said backward rocking movement being equal to the component of the angular velocity with which the conveying member rocks about its pivot as the result of its movement with the wheel.

8. Mechanism for conveying articles from one station to another comprising a wheel rotatable in one direction, a conveying member pivoted on the wheel to move therewith, removable walls enclosing a part-circular track through which the conveying member is moved, means for feeding an article to register with one end of said track, a receiving chamber forming a continuation of the other end of said track, and a stationary cam co-operating with the conveying member to prevent rocking movement of that member relatively to the wheel as it passes along the track but to cause it to rock backwardly as it approaches the entrance to the receiving chamber and move transversely thereof and clear of the article.

9. Article handling mechanism comprising means for delivering each article with its larger surfaces horizontal, a horizontal receiving chamber in which the articles are to be stacked with their larger surfaces vertical, a wheel, a conveying member pivotally mounted on the wheel and having an operative portion arranged to engage each article delivered by the delivering means and move it along a path subtending 90° at the centre of the wheel and terminating at the entrance of the receiving chamber, and a cam arranged to prevent pivotal movement of the conveying member relatively to the wheel as it passes along said part-circular track but to cause it to rock backwardly relatively to the wheel and to move transversely to the entrance of the receiving chamber as it pushes the article into the receiving chamber.

10. Article handling mechanism comprising means for delivering each article with its larger surfaces horizontal, a horizontal receiving chamber in which the articles are to be stacked with their larger surfaces vertical, a wheel, a plurality of conveying members pivotally mounted on the wheel, each of said members having an operative portion arranged to engage each flat article delivered by the delivering means and to move it in the arc of a circle to the entrance of the receiving chamber, and a cam arranged to prevent pivotal movement of the conveying member relative to the wheel as it passes along said arcuate track, and to cause the operative part of the conveying member at the delivery station to move parallel to itself and then to move transversely of the entrance to free an article therein and then to rock toward article engaging position.

ALFRED GERMAN ROSE.