Feb. 1, 1938. J. N. FRANCIS 2,106,975

ARTICLE FEEDING AND PACKAGING MECHANISM

Filed Sept. 18, 1934

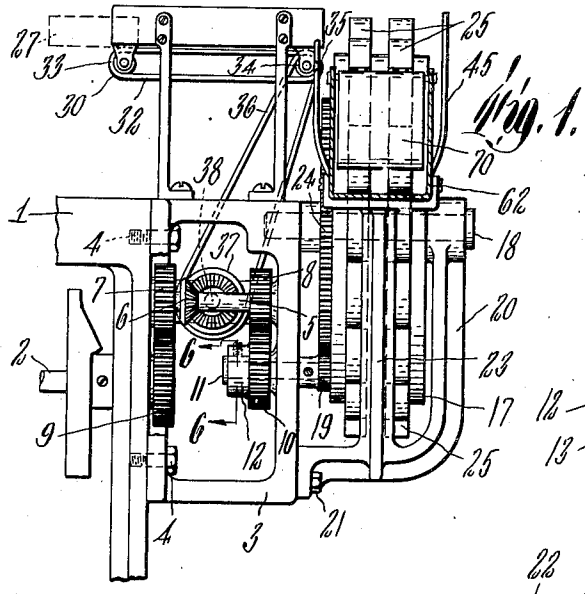

Fig. 1.

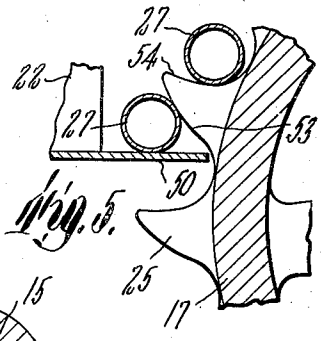

Fig. 5.

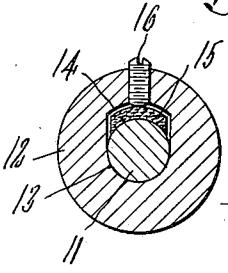

Fig. 6.

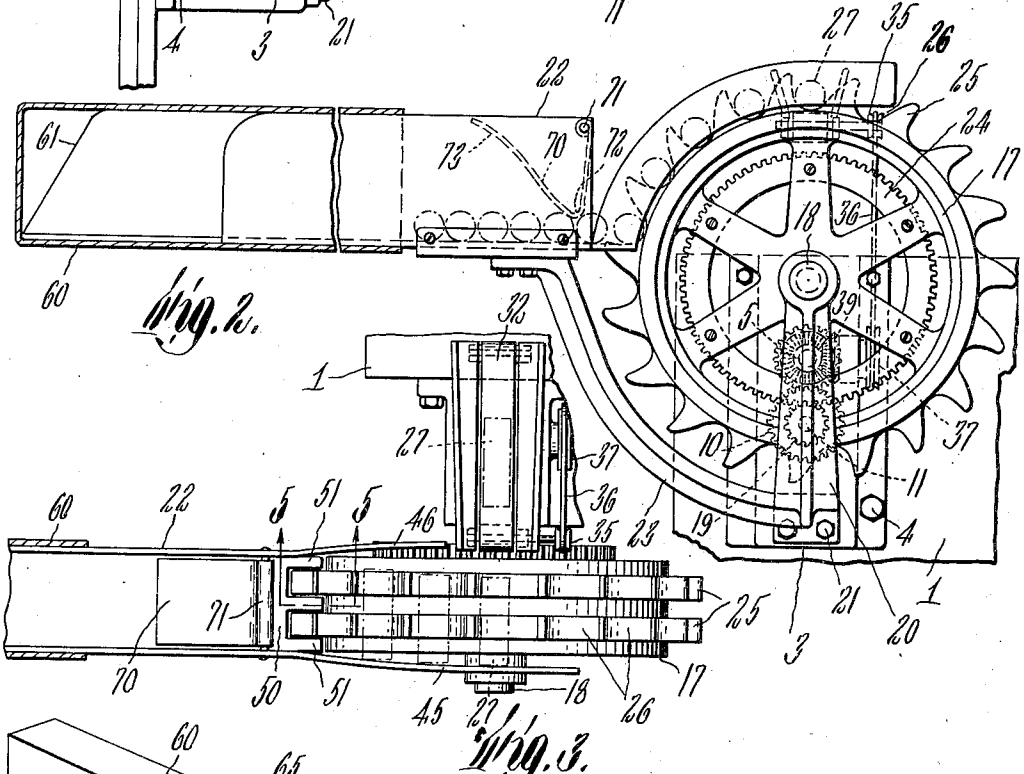

Fig. 2.

Fig. 3.

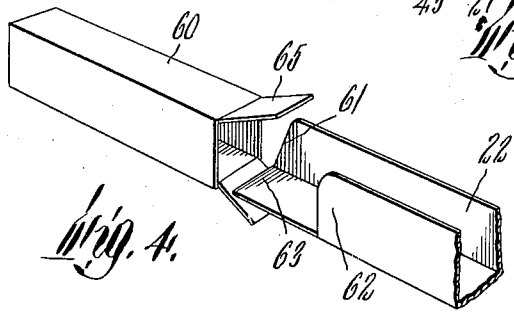

Fig. 4.

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ARTICLE FEEDING AND PACKAGING MECHANISM

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Application September 18, 1934, Serial No. 744,545

7 Claims. (Cl. 226—2)

This invention relates to mechanism for feeding and packaging articles as from a machine in which the articles are made, so as to largely eliminate the necessity of hand operations. More particularly the invention has been developed for the feeding and packaging of cylindrical articles, especially such as are of light weight, as, for example, cylindrical paper tube containers intended to be used in the packaging of coin. While not restricted to such use, it will be more fully described in connection with a machine for forming such coin containers illustrated in my Patent No. 1,690,287 granted November 6, 1928 for Method and machine for making paper tubes.

For a more complete understanding of this invention, reference may be had to the accompanying drawing in which

Figure 1 is a fragmentary end elevation of a portion of a coin wrapper forming machine illustrated in my patent hereinbefore mentioned, showing the mechanism of this invention attached thereto, the feeding trough or chute being shown in section.

Figure 2 is a side elevation of the same.

Figure 3 is a fragmentary top plan of the same.

Figure 4 is a fragmentary perspective showing the end of the packaging chute and the carton in which the articles are to be packaged.

Figure 5 is a fragmentary section on line 5—5 of Figure 3, but drawn to a larger scale.

Figure 6 is a detail section on line 6—6 of Figure 1.

In Figures 1, 2, and 3 at 1 is indicated a portion of the frame of the paper tube forming machine illustrated in my Patent No. 1,690,287 and at 2 in Figure 1 is indicated a rotary shaft journaled in said frame, this shaft corresponding to the shaft numbered 348 in Figure 6 in the patent. To this frame is secured a supplemental supporting frame 3, this supplemental frame being shown as secured to the frame 1 as by the screws 4. This frame has journaled crosswise therein a shaft 5 on which is secured a bevel pinion 6 and two gears 7 and 8. The gear 7 is in position to mesh with a gear 9 corresponding to the gear 347 shown in my patent and which is secured to the shaft 2. The gear 8 meshes with a gear 10 journaled on the shaft 11, but arranged to be clamped thereto by means shown best in Figure 6. The gear 10 is provided with a hub 12 having a bore 13 for the reception of the shaft 11, this bore being provided with a lateral enlargement 14 within which is positioned a friction shoe 15. This shoe may be formed of leather, or any other suitable material, and is arranged to be pressed into frictional engagement with the shaft 11 as by means of the set screw 16 threaded through the hub 12 and bearing at its inner end against the shoe 15. This provides a driving connection between the gear 10 and the shaft 11 which can slip, should the parts intended to be driven from the shaft 11 offer undue resistance. It also permits easy angular adjustment of the wheel to time it with the discharge of tubes from the forming machine.

The shaft 11 carries outwardly of the frame 3 a pinion 19 which may be pinned thereto and which meshes with a ring gear 24 secured to a wheel 17. This wheel 17 is journaled on a shaft 18, one end of which extends into the frame member 3, and the other end of which is held in a bracket 20 secured as by a screw 21 to frame member 3. This wheel 17 is arranged with a plane of rotation substantially axially disposed relative to an open topped chute or trough member 22, the end of which next to the wheel being shown as supported by an arm 23 extending from the bracket 20.

The wheel 17 as shown is provided with a pair of parallel spaced sets of peripheral teeth 25, the teeth of each set being arranged oppositely disposed to each other so as to define between them spaces such as 26 within which may be placed articles to be fed and packaged, as, for example, the paper tubes such as 27. These tubes as they are formed by the machine are ejected onto an endless conveyor 30 shown in Figure 1 as comprising a belt 32 extending over the end rollers 33 and 34. One of these rollers such as 34 is provided with a pulley 35 over which a belt 36 passes. This belt leads about a pulley 37 on a shaft 38 which also carries a beveled pinion 39 meshing with the pinion 6. Thus the belt 30 is driven at a relatively rapid speed so that as the articles are delivered thereto from the machine they are quickly transferred endwise and projected into the space between adjacent pairs of teeth 25 on the wheel 17.

In order to make sure that these articles are positioned properly located endwise so as to deliver on rotation of the wheel to the chute 22, guiding and positioning means have been illustrated. Such means comprises an abutment plate 45 which is arcuate to follow the curvature of the toothed periphery of the wheel 17, this plate extending to the highest point of the wheel which is considerably above the base of the chute 22. The upper end of this plate 45 is spaced well away from the side face of the wheel 17 but its lower end converges inwardly toward the side of the

chute 22 so that as the articles 27 are initially projected between the teeth of the wheel, they impinge on the plate 45, as shown in dotted lines in Figure 3, whereupon as the wheel 17 is rotated they are brought back to proper endwise position to enter the open end of the chute 22. Cooperating with the plate 45 is shown a second arcuate plate 46 positioned on the opposite side of the wheel in position to prevent excessive rebound of the articles as they strike the plate 45. These two plates cooperate to position the articles properly lengthwise, both converging at their lower ends to the sides of the chute.

The bottom wall of the chute has an extension 50 at its entering end, as shown best in Figures 3 and 5, provided with fingers 51 which extend between and on either side of the sets of teeth 25 to form supporting elements to receive the articles 27 as they are lowered thereonto by rotation of the wheel 17, and in order to insure the discharge of these articles into the mouth of the chute, the lower face of each of the teeth 25 on the discharge side of the wheel is formed convexed as at 53 so as to act as a cam to force the articles onto the chute as the wheel 17 is rotated. The upper side of each of the teeth on this side of the wheel is preferably concave as at 54 to form a receptacle to retain the articles in position until they are lowered onto the chute extension 50.

As shown the chute 22 has its outer end formed to be inserted into the carton 60 in which the articles are to be packaged and in order to facilitate the insertion of the chute, its wall portions may be cut away on each side as at 61 and 62, leaving the bottom wall 63 extended so as to be easily insertable in the carton. Thus the articles to be packaged are fed in through the chute into the carton and as the portion of the chute extending thereinto becomes filled to the open end of the carton, the top flap 65 may be lowered into the chute, thus holding the articles therein while the carton with the contents may be slipped off from the end of the chute. The side wall 62 of the chute is cut away to a substantial extent further than the opposite side wall which permits the hands of the operator to be inserted freely when the carton is nearly withdrawn so as to aid in insuring the complete filling of the carton as it is withdrawn.

In order to facilitate the complete filling of the carton, the article shown being of small heightwise dimension relative to the carton and elongated to nearly the width of the chute, means may be provided for preventing or impeding reverse motion of the articles in the chute and also to guide those coming in after the lower portion of the chute has been substantially filled, into superposed relation thereto. As shown this means consists of a baffle plate 70 of angular form which is shown as pivoted at 71 to the upper portion of the chute side walls near their entering end. It hangs down freely by gravity into the chute and is of sufficient length so that the articles may pass easily toward the carton, but the plate prevents or impedes reverse direction movement of the articles. The portion 73 of the plate extends upwardly inclined toward the carton end of the chute, thus acting to guide articles which are pushed therepast after the chute has become partially filled, toward the upper portion of the chute, thus to permit the articles to be fed in until the carton is full to the top of the chute. The carton may then be withdrawn and the top flap 65 pushed down, after which the carton may be entirely withdrawn in filled condition from the chute. The plate 70 may be lifted to permit removal of any articles which may become caught or jammed at the entrance to the chute.

From the foregoing description of an embodiment of this invention, it should be evident to those skilled in the art that various changes and modifications may be made without departing from the spirit or scope of this invention as defined by the appended claims.

I claim:

1. A mechanism of the class described, comprising a chute, a wheel having a plane of rotation substantially in the axis of said chute and projecting above the bottom of said chute, said wheel having peripheral teeth defining between them article receiving spaces from which articles are fed to said chute as said wheel is rotated, means for feeding articles successively into said spaces above the bottom of said chute in a direction transverse to the plane of rotation of said wheel, an abutment on one side of said wheel forming a stop against which the articles so fed may impinge, and inclined toward said wheel adjacent to said chute, means for rotating said wheel, and means cooperating with said abutment on the other side of said wheel to position said articles laterally of said wheel.

2. A mechanism of the class described, comprising a chute, a wheel having a plane of rotation substantially in the axis of said chute and projecting above the bottom of said chute, said wheel having peripheral teeth defining between them article-receiving spaces from which articles are fed to said chute as said wheel is rotated, means for feeding articles successively into said spaces above the bottom of said chute in a direction transverse to the plane of rotation of said wheel, an abutment on one side of said wheel forming a stop against which the articles so fed may impinge, and means for rotating said wheel, said abutment being spaced from said wheel where articles are fed thereto and converging toward said wheel adjacent to said chute.

3. A mechanism of the class described, comprising a chute, a wheel having a plane of rotation substantially in the axis of said chute and projecting above the bottom of said chute, said wheel having peripheral teeth defining between them article-receiving spaces from which articles are fed to said chute as said wheel is rotated, means for feeding articles successively into said spaces above the bottom of said chute in a direction transverse to the plane of rotation of said wheel, an abutment on one side of said wheel forming a stop against which the articles so fed may inpinge, means for rotating said wheel, said abutment being spaced from said wheel where articles are fed thereto and converging toward said wheel adjacent to said chute, and a stationary guide member on the opposite side of said wheel from said abutment cooperating with said abutment to position the articles laterally as they enter said chute.

4. A mechanism of the class described, comprising a chute shaped to enter and support a carton for packaging articles, means for feeding articles of small heightwise dimension relative to said carton successively along the bottom of said chute into said carton, and a plate hinged to the upper portion of said chute and free to swing on its hinge axis and inclined downwardly and in the direction of passage of articles therein toward said carton, said plate having an upward extension from its lower portion inclined toward

said carton in position to direct said articles into said carton in superposed relation.

5. A mechanism of the class described, comprising a chute shaped to support a carton for packaging articles, means for feeding articles of small heightwise dimension relative to said carton and to the depth of said chute successively along the bottom of said chute into said carton, and an obstruction in the upper portion of said chute and normally depending therein to a position adjacent to its base but spaced therefrom by an amount sufficient to permit the passage of a single layer of said articles therebeneath.

6. A mechanism of the class described, comprising a chute shaped to support a carton for packaging elongated articles arranged laterally of the chute and of small heightwise dimension relative to said carton and to the depth of said chute, means for feeding said articles successively along the bottom of the chute into said carton, and guide means in said chute extending from a position adjacent to said base but spaced therefrom sufficient for the passage of a single layer of articles therebeneath and inclined upwardly in the direction of feed and with the lower face of which said articles may engage to direct said articles into superposed relation into said carton until said carton is substantially filled.

7. A mechanism of the class described, comprising a chute shaped to support a carton for packaging elongated articles arranged laterally of the chute and of small heightwise dimension relative to said carton and to the depth of said chute, means for feeding said articles along said chute, and a guide plate in said chute depending in said chute to a position adjacent to the bottom thereof but normally spaced therefrom sufficient to allow said articles in a single layer to pass therebeneath and obstructing said chute above said space against passage of the articles, the lower face of said guide plate being inclined upwardly in the direction of feed to direct said articles into superposed relation in said carton until said carton is substantially filled.

JOSEPH N. FRANCIS.